SAN ANTONIO WATER SYSTEM

CENTRAL WATER INTEGRATION PIPELINE
MALTSBERGER PUMP STATION IMPROVEMENTS

SAWS Job No. 18-8617
SAWS Solicitation No. CO-00190

ADDENDUM No. 2

August 24, 2018

To Bidder of Record:

This addendum, applicable to work referenced above, is an amendment to the bidding documents and as such will be made a part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the addendum number and issue date in the space provided in submitted copies of the proposal.

CLARIFICATIONS

1. Instructions to Respondents Point 5.c on page IR-2 of the Contract Documents states that the Respondent is required to submit a Contractor's Qualification Statement formatted as directed in the Supplementary Instructions to Respondents. A Microsoft Word file of the forms to be included as part of the Contractor's Qualification Statement is available for download on the SAWS website.

REVISIONS TO CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

2. Insert Respondent's Questionnaire, attached herein.
3. Insert Respondent's Proposal Checklist, attached herein.
4. Insert the attached Wage Decision document to add Heavy/Highway Wage Decision
5. Replace the Building Wage Decision with attached Building Wage Decision.

SPECIAL CONDITIONS

a) Replace Section SC-4.1 in its entirety with the following:

Geotechnical Report has been developed for SAWS on this project and has been made available for Contractors for informational purposes only. SAWS will require the execution of a SAWS disclaimer form by the CONTRACTOR as a condition of and prior to the release of the report.

The following reports are available:

1. SAWS Central Water Integration Pipeline Project, Maltsberger Pump Station Improvements, San Antonio, Texas.
2. SAWS Central Water Integration Pipeline Project, Pressure Relief Valve Sites.

Replace SECTION 02821-CHAIN LINK FENCES AND GATES specification section in its entirety with the Section 02821-Chain Link Fences and Gates, attached herein.

Insert SECTION 15055 – STEEL PIPE specification section, attached herein.

Insert SECTION 15056 – STEEL PIPE FABRICATED SPECIALS specification section, attached herein.

REVISIONS TO DRAWINGS

SHEET E-2304 – MALTSBERGER PS ELECTRICAL SITE PLAN - I

a) Remove Sheet E-2304 in its entirety and replace with the revised version included in this Addendum.

SHEET E-2305 – MALTSBERGER PS ELECTRICAL DUCT BANK SECTION - I

a) Remove Sheet E-2304 in its entirety and replace with the revised version included in this Addendum.

SHEET E-2306 – MALTSBERGER PS ELECTRICAL DUCT BANK SECTION - II

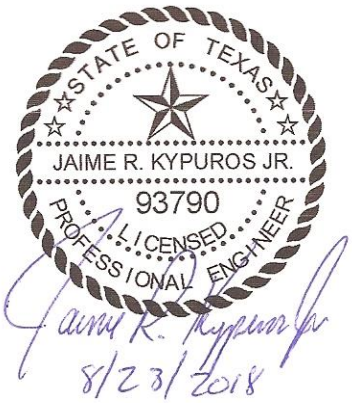
a) Remove Sheet E-2304 in its entirety and replace with the revised version included in this Addendum.

SHEET E-2307 – MALTSBERGER PS ELECTRICAL DUCT BANK SECTION - III

a) Add Sheet E-2307 to the plan set included in this Addendum.

The remainder of the bid documents remain unchanged.

This addendum is comprised of a total of **66** pages (including attachments).



END OF ADDENDUM No. 2

Respondent Questionnaire

Rev. 5/7/18

PROJECT NAME: Central Water Integration Pipeline Maltsberger Pump Station Improvements

Instructions: The Respondent Questionnaire is a required questionnaire. Complete the questionnaire by inserting the requested information. Do not modify or delete the questions.

GENERAL INFORMATION

1. **Respondent Information:** Provide the following information regarding the Respondent.
(NOTE: Co-Respondents are two or more entities proposing as a team or joint venture with each signing the Agreement, if awarded. Sub-contractors are not Co-Respondents and should not be identified here. If this submittal includes Co-Respondents, provide the required information in this Item #1 for each Co-Respondent by copying and inserting an additional block(s) before Item #2.)

   Respondent Name: _____
   (NOTE: Give exact legal name as it will appear on the Agreement, if awarded.)

   Principal Address: _____

   City: _____ State: _____ Zip Code: _____

   Telephone No. _____ Fax No: _____

   Social Security Number or Federal Employer Identification Number: _____

2. **Contact Information:** List the one person who SAWS may contact concerning your submittal or setting dates for meetings.
   Name: _____

   Address: _____

   City: _____ State: _____ Zip Code: _____

   Telephone No. _____ Fax No: _____

   _____ Email: _____

   _____

3. Identify the principal contact person authorized to commit the Respondent to a contractual agreement.

   _____

   _____

(Note: If a Respondent is a Joint Venture entity that currently exists and has the financial capability of completing this project solely based on the assets of the Joint Venture, then questions 4,5,6,7,8,9, and 10 would pertain only to the joint venture entity. If the Joint Venture entity is being created for this project, then those questions pertain to the co-respondent members.)

4. Does Respondent anticipate any mergers, transfer of organization ownership, management reorganization, or departure of key personnel within the next twelve (12) months?

   Yes ☐ No ☐

5. Is Respondent authorized and/or licensed to do business in Texas?

   Yes ☐ No ☐ If "Yes", list authorizations/licenses.

   _____

   _____

6. **Affirmative Action -** Respondent agrees to adhere to the EEO requirements contained in the RFQ section IV, sub-section "C." paragraph 10.a.

   Yes ☐ No ☐ If "No", state reason.

   _____

   _____

7. **Debarment/Suspension Information:** Has the Respondent or any of its principals been debarred or suspended from contracting with any public entity?

   Yes ☐ No ☐ If "Yes", identify the public entity and the name and current phone number of a representative of the public entity familiar with the debarment or suspension, and state the reason for or circumstances surrounding the debarment or suspension, including but not limited to the period of time for such debarment or suspension.

8. **Bankruptcy Information:** Has the Respondent ever been declared bankrupt or filed for protection from creditors under state or federal proceedings?

   Yes ☐ No ☐ If "Yes", state the date, court, jurisdiction, cause number, amount of liabilities and amount of assets.

   _____

9. Provide any other names under which Respondent has operated within the last 10 years.

   _____

10. **Litigation Disclosure**: Respond to each of the questions below by checking the appropriate box. Failure to fully and truthfully disclose the information required in the Litigation Disclosure questions may result in the disqualification of your submittal from consideration or termination of the Agreement, once awarded.

    a. Have you or any member of your Firm or Team to be assigned to this project ever been indicted or convicted of a felony or misdemeanor greater than a Class C in the last five (5) years?

       Yes ☐ No ☐

    b. Have you or any member of your Firm or Team to be assigned to this project been terminated (for cause or otherwise) from any work being performed for the San Antonio Water System or any other Federal, State or Local Government, or Private Entity?

       Yes ☐ No ☐

c. Have you or any member of your Firm or Team to be assigned to this project been involved in any claim or litigation with the San Antonio Water System or any other Federal, State or Local Government, or Private Entity during the last ten (10) years?

Yes ☐ No ☐

If you have answered "Yes" to any of the above questions, please indicate the name(s) of the person(s), the nature, and the status and/or outcome of the information, indictment, conviction, termination, claim or litigation, as applicable. Any such information should be provided on a separate page, attached to this form and submitted with your submittal.

11. **Compliance Agreement:**

Nondisclosure. No information obtained by Respondent from SAWS shall be disclosed by Respondent to any third party. In the event Respondent is subject to the Texas Public Information Act, upon receipt of a request for any information obtained by Respondent, Respondent shall provide notice to SAWS of the request along with a copy of the request, and give SAWS the opportunity to respond to the request prior to its release by Respondent.

No Lobbying and Compliance with Law. During the selection process for the project named in this RFQ, Respondent agrees to comply with all applicable laws and regulations, including but not limited to restrictions against direct or indirect lobbying of public officials. Respondent agrees not to make or permit to be made any improper payments, or to perform any unlawful acts.

This agreement shall be construed to be enforceable to the maximum extent permitted by law.

Failure to complete this question or comply with its terms may subject this firm to elimination from the selection process at any time.

Does the Respondent agree to the above?
Yes ☐ No ☐

12. **Security Procedures:** Respondent acknowledges having read the security procedures in Exhibit "E" and understands the requirements. Respondent is prepared to perform at their own expense background security checks on their employees, or the employees of their consultants or sub-consultants if requested by SAWS.

Yes ☐ No ☐

13. **Addendums:** Each Respondent is required to acknowledge receipt of all addendums.

None ☐ Yes ☐ If "Yes", Identify.

_____

The information provided above is true and accurate to the best of my knowledge. Furthermore, we understand that failure to complete the Respondent Questionnaire may subject this firm to elimination from the selection process.

_____ _____
Signature Date

_____
Printed Name

_____
Title

RESPONDENT'S PROPOSAL CHECKLIST

Project Name: Central Water Integration Pipeline Maltsberger Pump Station Improvements
SAWS Job No. 18-8617
SAWS Solicitation Number: CO-00190

ENVELOPE 1 (sealed envelope or box)

- ☐ **Signed Price Proposal/Acknowledgement of Addendums** (Do **not** include this Price Proposal within the 7 required copies)
- ☐ **Signed Proposal Certification Page (PC-1)**
- ☐ **Bid Bond/Cashier's Check**

ENVELOPE (OR BOX) 2
ORIGINAL PROPOSAL

- ☐ Proposal Checklist
- ☐ One (1) CD of Original Proposal Packet *(excluding the Price Proposal)*
- ☐ Statement on President's Executive Orders – Page IR 8
- ☐ Good Faith Effort Plan
- ☐ Conflict of Interest Questionnaire – Form CIQ *(Rev. 11/30/2015)*
- ☐ W-9
- ☐ Proof of Insurability (Letter from Insurer or Sample Certificate of Insurance)
- ☐ Respondent Questionnaire
- ☐ Team Qualifications and Similar Prior Experience
  - ☐ a. Project Team Structure and Key Personnel (utilize SIR form)
  - ☐ b. Prime Contractor Qualifications, Experience and Safety Record (utilize SIR form)
  - ☐ c. Key Subcontractors Qualifications, Experience and Safety Record (utilize SIR form)
  - ☐ Organizational Chart
  - ☐ Key Personnel's Resumes
  - ☐ Total Recordable Incident Rate Records
  - ☐ Experience Modification Rate Records
- ☐ Narratives for Project Approach, Schedule, and Resource Availability
  - ☐ Quality Management Plan
  - ☐ Primavera or Microsoft project schedule

PROPOSAL PACKET COPIES -7 (separate sealed envelope or box for all 7 copies)

- ☐ Proposal Checklist
- ☐ Respondent Questionnaire
- ☐ Team Qualifications and Similar Prior Experience
  - ☐ a. Project Team Structure and Key Personnel (utilize SIR form)
  - ☐ b. Prime Contractor Qualifications, Experience and Safety Record (utilize SIR form)
  - ☐ c. Key Subcontractors Qualifications, Experience and Safety Record(utilize SIR form)
  - ☐ Organizational Chart
  - ☐ Key Personnel's Resumes
  - ☐ Total Recordable Incident Rate Records
  - ☐ Experience Modification Rate Records
- ☐ Narratives for Project Approach, Schedule, and Resource Availability
  - ☐ Quality Management Plan
  - ☐ Primavera or Microsoft project schedule

I certify that the proposal packet submitted includes the items as indicated above.

Signature	Date
Printed Name	
Title	

General Decision Number: TX180016 01/05/2018 TX16

Superseded General Decision Number: TX20170016

State: Texas

Construction Types: Heavy and Highway

Counties: Atascosa, Bandera, Bastrop, Bell, Bexar, Brazos, Burleson, Caldwell, Comal, Coryell, Guadalupe, Hays, Kendall, Lampasas, McLennan, Medina, Robertson, Travis, Williamson and Wilson Counties in Texas.

HEAVY (excluding tunnels and dams, not to be used for work on Sewage or Water Treatment Plants or Lift / Pump Stations in Bell, Coryell, McClennon and Williamson Counties) and HIGHWAY Construction Projects

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018

* SUTX2011-006 08/03/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures)	$ 12.56	
ELECTRICIAN	$ 26.35	
FORM BUILDER/FORM SETTER		
Paving & Curb	$ 12.94	
Structures	$ 12.87	
LABORER		

Asphalt Raker.....$ 12.12
Flagger.....$ 9.45
Laborer, Common.....$ 10.50
Laborer, Utility.....$ 12.27
Pipelayer.....$ 12.79
Work Zone Barricade Servicer.....$ 11.85

PAINTER (Structures).....$ 18.34

POWER EQUIPMENT OPERATOR:
Agricultural Tractor.....$ 12.69
Asphalt Distributor.....$ 15.55
Asphalt Paving Machine.....$ 14.36
Boom Truck.....$ 18.36
Broom or Sweeper.....$ 11.04
Concrete Pavement Finishing Machine.....$ 15.48
Crane, Hydraulic 80 tons or less.....$ 18.36
Crane, Lattice Boom 80 tons or less.....$ 15.87
Crane, Lattice Boom over 80 tons.....$ 19.38
Crawler Tractor.....$ 15.67
Directional Drilling Locator.....$ 11.67
Directional Drilling Operator.....$ 17.24
Excavator 50,000 lbs or Less.....$ 12.88
Excavator over 50,000 lbs...$ 17.71
Foundation Drill, Truck Mounted.....$ 16.93
Front End Loader, 3 CY or Less.....$ 13.04
Front End Loader, Over 3 CY.$ 13.21
Loader/Backhoe.....$ 14.12
Mechanic.....$ 17.10
Milling Machine.....$ 14.18
Motor Grader, Fine Grade....$ 18.51
Motor Grader, Rough.....$ 14.63
Pavement Marking Machine....$ 19.17
Reclaimer/Pulverizer.....$ 12.88
Roller, Asphalt.....$ 12.78
Roller, Other.....$ 10.50
Scraper.....$ 12.27
Spreader Box.....$ 14.04
Trenching Machine, Heavy....$ 18.48

Servicer.....$ 14.51

Steel Worker
Reinforcing.....$ 14.00
Structural.....$ 19.29

TRAFFIC SIGNAL INSTALLER

Traffic Signal/Light Pole
Worker.....$ 16.00

TRUCK DRIVER
Lowboy-Float.....$ 15.66
Off Road Hauler.....$ 11.88
Single Axle.....$ 11.79
Single or Tandem Axle Dump
Truck.....$ 11.68
Tandem Axle Tractor w/Semi
Trailer.....$ 12.81

WELDER.....$ 15.97

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

General Decision Number: TX180280 08/03/2018 TX280

Superseded General Decision Number: TX20170280

State: Texas

Construction Type: Building

County: Bexar County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018
1	01/12/2018
2	03/23/2018
3	04/20/2018
4	07/06/2018
5	08/03/2018

ASBE0087-014 01/01/2018

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 22.72	10.02

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 28.00	22.35

ELEC0060-003 06/01/2016

	Rates	Fringes

ELECTRICIAN (Communication Technician Only)	$ 21.57	9%+4.65

ELEC0060-004 06/01/2018

	Rates	Fringes
ELECTRICIAN (Excludes Low Voltage Wiring)	$ 28.30	13%+5.05

ELEV0081-001 01/01/2018

	Rates	Fringes
ELEVATOR MECHANIC	$ 39.32	32.645+a+b

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

ENGI0450-002 04/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR Cranes	$ 34.85	9.85

IRON0066-013 06/01/2017

	Rates	Fringes
IRONWORKER, STRUCTURAL	$ 21.55	6.73

IRON0084-011 06/01/2017

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 23.27	7.12

PLUM0142-009 07/01/2017

	Rates	Fringes
HVAC MECHANIC (HVAC Electrical Temperature Control Installation Only)	$ 30.25	11.80
HVAC MECHANIC (HVAC Unit Installation Only)	$ 30.25	11.80
PIPEFITTER (Including HVAC Pipe Installation)	$ 30.25	11.80

PLUMBER (Excludes HVAC Pipe Installation)	$ 30.25	11.80

SFTX0669-002 04/01/2017

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers)	$ 29.03	15.84

* SHEE0067-004 04/01/2018

	Rates	Fringes
Sheet metal worker		
Excludes HVAC Duct Installation	$ 26.35	15.29
HVAC Duct Installation Only	$ 26.10	15.25

SUTX2014-006 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 22.15	0.00
CARPENTER (Acoustical Ceiling Installation Only)	$ 17.83	0.00
CARPENTER (Form Work Only)	$ 13.63	0.00
CARPENTER, Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work, and Metal Stud Installation	$ 16.86	4.17
CAULKER	$ 15.00	0.00
CEMENT MASON/CONCRETE FINISHER	$ 22.27	5.30
DRYWALL FINISHER/TAPER	$ 13.81	0.00
DRYWALL HANGER AND METAL STUD INSTALLER	$ 15.18	0.00
ELECTRICIAN (Low Voltage Wiring Only)	$ 20.39	3.04
IRONWORKER, REINFORCING	$ 12.27	0.00
LABORER: Common or General	$ 10.75	0.00
LABORER: Mason Tender - Brick	$ 11.88	0.00
LABORER: Mason Tender - Cement/Concrete	$ 12.00	0.00

LABORER: Pipelayer	$ 11.00	0.00
LABORER: Roof Tearoff	$ 11.28	0.00
LABORER: Landscape and Irrigation	$ 8.00	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 15.98	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 14.00	0.00
OPERATOR: Bulldozer	$ 14.00	0.00
OPERATOR: Drill	$ 14.50	0.00
OPERATOR: Forklift	$ 12.50	0.00
OPERATOR: Grader/Blade	$ 23.00	5.07
OPERATOR: Loader	$ 12.79	0.00
OPERATOR: Mechanic	$ 18.75	5.12
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 12.00	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 13.07	0.00
ROOFER	$ 12.00	0.00
TILE FINISHER	$ 11.32	0.00
TILE SETTER	$ 14.94	0.00
TRUCK DRIVER: Dump Truck	$ 12.39	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65	8.57
TRUCK DRIVER: Semi-Trailer Truck	$ 12.50	0.00
TRUCK DRIVER: Water Truck	$ 12.00	4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the

Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that

no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

SECTION 02821

CHAIN-LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. The work in the section shall include furnishing all labor, materials, equipment and appliances necessary to complete all: Chain-Link Fences; Heavy Duty Cantilever Slide Gates; Swing Gates; and Personnel Gates required for this project in strict accordance with this specification section and drawings.

B. Related Sections:

1. Section 03300 – Cast-in-Place Concrete for cast-in-place concrete pads, gate operators, post footings and concrete mow strip.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. A1210, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
2. A392, Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
3. A491, Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
4. A570, Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
5. A585, Standard Specification for Aluminum-Coated Steel Barbed Wire.
6. A824, Standard Specification for Metallic-Coated Steel Marcelled Tension Wire for Use with Chain-Link Fence.
7. B6, Standard Specification for Zinc.
8. B117, Standard Specification for Salt Spray Testing.
9. C94, Standard Specification for Ready-Mixed Concrete.
10. C143, Standard Test Method for Slump of Hydraulic Cement Concrete.
11. C387, Standard Specifications for Packaged, Dry, Combined Materials for Mortar and Concrete.
12. F552, Standard Definitions of Terms Relating to Chain Link Fencing.
13. F567, Practice for Installation of Chain-Link Fence.
14. F626, Standard Specification for Fence Fittings.
15. F669, Standard Specifications for Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence.

16. F900, Standard Specification for Industrial and Commercial Swing Gates.
17. F1083, Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
18. F1183, Standard Specifications for Aluminum Alloy Chain Link Fence Fabric.
19. F1184, Standard Specifications for Industrial and Commercial Horizontal Slide Gates.
20. F1234, Protective Coatings on Steel Framework for Fences.
21. F2200, Standard Specification for Automated Vehicular Gate Construction.

B. Underwriters Laboratory Gate Operator Requirements (UL 325).

C. American Welding Society AWS D1.2 Structural Welding Code.

1.3 DEFINITIONS

A. Terms as defined in ASTM F552.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's catalog cuts with printed specifications and installation instructions for each type of product indicated in conformance with Section 01300 - Submittals.

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Accessories.
4. Gates and hardware.
5. Locking carousel.

Note: If operated gate system is required, furnish two (2) copies of operation and maintenance data covering the installed products.

B. Shop Drawings: Include layout plans for fences and gates, elevations, sections, details, and attachments to other work. Include details of gate construction, gate height, and post spacing dimensions. Show accessories, hardware, finish of components, post foundations, concrete mow strip, gate operation, and operational clearances.

C. Samples, if requested, for Initial Selection: For components with factory-applied finishes.

D. Samples, if requested, for Verification: Prepared on Samples of size indicated below:

1. Approximately six (6) inch square or six (6) inch lengths for posts, rails, braces, fabric, wire, ties and fittings.

E. Certification of Performance Criteria:

1. Manufacturer of gate system shall provide certification stating the gate system includes the following material components that provide superior performance and longevity. Alternate designs built to minimum standards that do not include these additional structural features shall not be accepted.

a. Gate track system shall be keyed to interlock into gate frame member (providing 200 percent additional strength when compared to weld only keyless systems). When interlocked with and welded to the "keyed" frame top member, gate track forms a composite structure.

b. Gate shall have a minimum counterbalance length of fifty (50) percent opening width which provides a thirty-six (36) percent increase in lateral resistance (when compared to ASTM minimum of forty (40) percent counterbalance). If gate is ever to be automated, counterbalance section shall be filled with fabric or other specified material.

c. To provide superior structural integrity, intermediate vertical members shall be used – with spaces between verticals to be less than fifty (50) of the gate frame height.

d. Entire gate frame (including counterbalance section) shall include two (2) adjustable stainless steel cables (minimum 3/16 inch) per bay to allow complete gate frame adjustment (maintaining strongest structural square and level orientation).

e. Gate truck assemblies shall be tested for continuous duty and shall have plated steel bearings meeting ASTM B 117 salt spray test with no red rust after 790-hours. Bearings shall be specifically designed for roller applications with full complement ball bearings, shock resistant outer races, and captured seals.

f. Gate truck assemblies shall be supported by a minimum 5/8 inch plated steel bolt with self-aligning capability, rated to support a 2,000 lb. reaction load.

g. Hanger brackets shall be hot dipped galvanized steel with a minimum 3/8 inch thickness that is also gusseted for additional strength.

h. Gate top track and supporting hangar bracket assemblies shall be certified by a licensed professional engineer to withstand a 2,000 lb. vertical reaction load without exceeding allowable stresses.

F. Certifications:

1. Gate in compliance with ASTM F 2200, Standard Specification for Automated Vehicular Gate Construction per section 2.01 C.

2. If operated gate system, gate operator shall be in compliance with UL 325 as evidenced by UL listing label attached to gate operator.

3. The aluminum welders and welding process must be certified.

4. Manufacturer shall supply gate design performance certification as per Section 1.4 E.

G. Product Test Reports: For framing strength according to ASTM F 1043.

H. Quality Control Submittals:

1. Manufacturers recommended install instructions.

2. Evidence of supplier and installer qualifications.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Gate System Supplier: five (5) years' experience in gate systems.
2. Gate System Installer: three (3) years' experience and approved by system Supplier.

1.7 SCHEDULING AND SEQUENCING

A. Complete necessary site preparation and finish grading before installing concrete mowstrip, chain link fence and gates.

PART 2 - PRODUCTS

2.1 GENERAL

A. Match style, finish, and color of each fence component with that of other fence components.

B. Obtain chain link fences and gates, including accessories, fittings and fasteners from a single source.

2.2 CHAIN LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with requirements indicated below:

1. Fabric Finish: Hot-dip galvanized steel fabric conforming to ASTM A392, Class I.
2. Fabric Height: 96 inches (8 feet) nominal fence height, unless otherwise shown.
3. Steel Wire Fabric: Wire with a minimum diameter of 0.148 inch (9-gauge).
4. Pattern: 1-inch diamond mesh.
5. Twisted Selvage:
    a. Twisted in a full helix three full turns.
    b. Cut at angle to provide sharp barbs that extend minimum 1/4 inch beyond twist.

2.3 FENCE FRAMING

A. General:

1. Finish shall match fabric.
2. Strength and Stiffness Requirements: ASTM F669, Heavy Industrial Fence, except as modified in this section.

3. Steel Pipe: ASTM F183.

4. Roll-Formed Steel Shapes: Roll-formed from ASTM A570, Grade 45, steel.

5. Lengths: Manufacturer's standard with allowance for minimum embedment below finished grade as shown on drawings.

6. Protective Coatings:

   a. Zinc Coating: ASTM F1043, Type A coating.

B. Line Posts:

1. Steel Pipe:

   a. Outside Diameter: 2-3/8 inches.

   b. Weight: 3.65 pounds per foot.

C. End, Corner, Angle and Pull Posts:

1. Steel Pipe:

   a. Outside Diameter: 4 inch.

   b. Weight: 9.11 pounds per foot.

D. Posts for Removable Fence Panels: As specified for end, corner, angle and pull posts.

E. Top, Bottom and Mid Rails:

1. Steel Pipe:

   a. Outside Diameter: 1-5/8 inch.

   b. Weight: 2.27 pounds per foot.

F. Posts for Swing Gates:

1. ASTM F900.

2. Roll-formed steel shapes may be substituted for steel pipe posts for gate leaf widths up to 6 feet and fabric heights up to 8 feet.

3. Outside Diameter: 3 inch; 5.79 lbs/foot for gate leaf width up to 6 feet.

4. 4 inch; 9.11 lbs/foot for gate leaf width over 6 feet to 12 feet.

G. Posts for Sliding Gates: ASTM F1184, Type II, Class 2.

2.4 TENSION WIRE

A. Zinc-Coated Steel Wire: Marcelled tension wire complying with and ASTM A824, Type II.

2.5 BARBED WIRE

A. Steel Barbed Wire: Comply with ASTM A121 consisting of a strand of two wires, 12-1/2 gauge, twisted with four-point round barbs spaced not more than 5 inches o.c.

1. CONTRACTOR to provide three rows of barbed wire at top of fence as shown on Plans.

2.6 GATES

A. General:

1. Gate operation: Opened and closed easily by one person.
2. Chain Link Fabric: Attached securely to gate frame at intervals not exceeding 15 inches.

B. Cantilever Slide Gates:

1. Classification: Fabricate chain link cantilever slide gates in accordance with ASTM F 1184. Type II Cantilever Slide, Class 2 with internal roller assemblies.
2. Manufacturers:
   a. The cantilever slide gate system shall be manufactured by Tymetal Corp., 2549 State Route 40, Greenwich, NY 12834. Ph. (800) 328-4283.
   b. Approved substitution – all other systems must be submitted to the design team in accordance with substitution requirements as set forth in the general provisions of the specification manual. Products submitted must meet performance criteria as per Section 1.4 E.
3. Certifications:
   a. Gate manufacturer shall certify gate is manufactured in compliance with Section 1.4 F.
   b. Gate manufacturer shall provide independent certification as to the use of a documented Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 welding code. Upon request, Individual Certifications of Welder Qualifications documenting successful completion of the requirements of the AWS D1.2 code shall be provided.
4. Dimensions: Per the project drawings.
5. Construction Details:
   a. Gate Frame:
      i. The gate frame shall be fabricated from 6063-T6 aluminum alloy extrusions. The top member shall be a 3” x 5” (76mm x 127mm) aluminum structural channel/tube extrusion weighing not less than 3.0 lb/lf (4.4 kg/m). To maintain structural integrity this frame member shall be “keyed” to interlock with the “keyed” track member. If fabricated as a single horizontal piece, the bottom member shall be a 2” x 5” (51mm x 127mm) aluminum structural tube weighing not less than 2.0 lb/lf (2.9kg/m). When the gate frame is manufactured in two horizontal pieces or sections, they shall be spliced in the field (the gate frame shall be fabricated in one or multiple sections depending on size requirements or project constraints.
   b. Vertical Members:
      i. The vertical members at the ends of the gate frame shall be “P” shaped in cross section with a nominal base dimension of no less than 2” x 2” (51mm x 51mm) and weighing not less than 1.1 lb/lf (2.3kg/m). Major 2” x 2”

(51mm x 51mm) vertical members weighing not less than 1.1 lb/lf shall separate each bay and shall be spaced at less than gate height intervals.

ii. Intermediate 1" x 2" (25mm x 51mm) vertical members weighing not less than 0.82 lb/lf shall alternate between 2" x 2" major members.

c. Gate Track:

i. The gate frame shall have a separate semi-enclosed "keyed" track, extruded from 6005A-T61 or 6105-T5 aluminum alloy, weighing not less than 2.9 lb/lf (4.2 kg/m). The track member is to be located on only one side of the top primary. Welds to be placed alternately along the top and side of the track at 9" (229mm) centers with welds being a minimum of 2" (51mm).

d. Welds:

i. All welds on the gate frame shall conform to Welding Procedure Specification and Procedure Qualification Record to insure conformance to the AWS D1.2 Structural Welding Code. All individual welders shall be certified to AWS D1.2 welding code.

e. Gate Mounting:

i. The gate frame is to be supported from the track by two (2) swivel type, self-aligning, 8-wheeled, sealed lubricant, ball-bearing truck assemblies.

ii. The bottom of each support post shall have a bracket equipped with a pair of 3" (76mm) UHMV guide wheels. Wheel cover protectors shall be included with bottom guides to comply with UL325.

iii. Gap protectors shall be provided and installed, compliant with ASTM F 2200.

f. Diagonal Bracing:

i. Diagonal "X" bracing of 3/16" (5mm) minimum diameter stainless steel aircraft cable shall be installed throughout the entire gate frame.

g. The gate shall be completed by installation of approved filler as specified.

i. Chain Link: 1" x 1" x 9 gauge galvanized steel chain link fabric shall extend the entire length of the gate (if operated gate, counterbalance must also have fabric to prevent reach through and comply with ASTM F2200. Fabric shall be attached at each end of the gate frame by standard fence industry tension bars and tied at each 2" x 2" and 1" x 2" vertical members with standard fence industry ties at three different places each member. ASTM F2200 requires attachment method that leaves no leading or bottom edge protrusions (cannot exceed 0.5 inch). Chain link fabric must have a triple twisted selvage top and bottom with a cut at slant 1/4" above twist.

6. Posts: Per Section 2.3 C.

7. Finish: Gate to be mill finish aluminum.

8. Warranty: the truck assembly shall be warranted against manufacturing defects by the manufacturer for a period of five (5) years from date of sale.

2.7 GATE OPERATOR SYSTEM

A. Card readers to be installed at all gates in accordance with the Drawings.

2.8 FITTINGS (FENCE)

A. General: Comply with ASTM F 626, except as modified by this specification.

1. Finish shall match fabric.

B. Post Line and Caps: Provide for each post.

1. Designed to accommodate passage of top rail through cap, where top rail required.

C. Rail and Brace Ends: For each gate, corner, pull, and end post.

D. Tension and Brace Bands: Galvanized.

E. Tension Bars:

1. One-piece vinyl clad.

2. Equal in length to full height of fabric.

F. Truss Rod Assemblies: 3/8 inch diameter.

G. Tie Wires, Clips, and Fasteners: According to ASTM F 626.

1. Standard round wire ties for attaching chain-link fabric to posts, rails, and frames, complying with the following:

H. Barb Arms: Heavy weight pressed steel arms having an incline of 45 degrees. Arms with clips, slots, or other means for attaching strands of barbed wire, and means for attaching to posts integral with post cap; for each post unless otherwise indicated.

2.9 BARBED FENCE

A. Not Applicable.

2.10 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

2.11 CONCRETE

A. Provide minimum compressive strength of 3,000 psi as specified in Section 03300 – Cast-in-Place Concrete.

2.12 LOCKS

A. All manual gates shall include a SAWS standard disk locking system as shown in plans, with a padlock. Padlocks shall be Medico and keyed into Owner's existing master key system.

2.13 REMOVABLE FENCE PANELS

A. Panel Length:

1. Equal division of total length of removable fence section.
2. Maximum ten (10) feet.

B. Frames: ASTM F1184, Type I

2.14 ROLLING GATE OPERATOR:

1. There shall be a Chain Driven Type Slide Gate Operator for the opening/closing of each access gate. 208 V single phase single-phase power will be furnished on-site. It shall be provided with and connected to obstruction loops inserted on both sides of the entrance access gate. The obstruction loops inserted on both sides of the entrance access gate. The obstruction loops shall be buried 4 –inches in the concrete pavement an arranged as per the Contract Drawings.
2. Manufacturer: Door King model DKS 9150 with:
    a. Plug in Loop Detector Option
    b. Provide Disconnection Switch adjacent to operator. Mount to rack constructed of 2" galvanized pipe and strut similar to other racks specified for this project.
    c. Operator shall be mounted on contractor installed 26"L x21.5"W x 4" H concrete slab per the manufacturer. Refer to installation manual for spacing from gate and other requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, finish grading and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted in writing by Owner.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Verify areas to assure sufficient space to receive gate in open position.

D. Ensure property lines and legal boundaries of work are clearly established.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. Install chain-link fencing and gates in accordance with ASTM F 567 except as modified in this section and in accordance with fence manufacturer's recommendation, as approved by Engineer. Erect fencing in straight lines between angle points.

B. Fence shall be installed by CONTRACTOR registered with the American Fence Association.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Driven Posts are not acceptable.

B. Post Excavation: Drill or hand-excavate (using post-hole diggers) holes for posts to diameters and spacing indicated, in firm, undisturbed soil or compacted soil.

C. Post Setting: Set posts in concrete at indicated spacing as described below. Set Posts into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations.

2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

    a. Exposed Concrete: Extend above grade; shape and smooth to shed water.

    b. Posts Set in Concrete: Drill holes in firm, undisturbed or compacted soil. Holes shall have diameter 12 inches greater than outside dimension of post, and depths approximately 3 inches deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36 inches below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour, tamp for consolidation. Trowel finish around post and slope to direct water away from posts. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

D. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment as indicated on Drawings.

E. Line Posts: Space line posts uniformly at ten (10) feet on center maximum.

F. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at mid-height of fabric on fences with top rail and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

G. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 11-gage diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire through post cup loops before stretching fabric and tie to each post cap with not less than 6-gage galvanized wire.

H. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

I. Intermediate and Bottom Rails: Install and secure to posts with fittings.

J. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave two (2) inches maximum between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

K. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than fifteen (15) inches o.c.

L. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two (2) full turns. Bend ends of wire to minimize hazard to persons or clothing. All tire wire to be galvanized steel.

1. Maximum Spacing: Tie fabric to line posts at twelve (12) inches o.c. and to braces at twenty-four (24) inches o.c.

M. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

N. Mow Strip: Where called for on the plans; provide mow strip with dimensions shown on plans.

O. Barbed Wire: Wire shall be taut and rows evenly spaced.

3.5 GATE INSTALLATION

A. Install gates in strict accordance with manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Adjust hardware for smooth operation and lubricate where necessary. Gate shall operate satisfactorily from open or closed position.

B. Set gate stops in concrete to engage center drop rod or plunger bar.

C. Cantilever gate and installation shall conform to ASTM F 1184 standards for aluminum cantilever slide gates, Type II, Class 2.

3.6 GATE OPERATOR INSTALLATION

A. Install gate operators in accordance with the Drawings.

3.7 SYSTEM VALIDATION

A. Cantilever Slide Gate:

1. The complete system shall be adjusted to assure it is performing properly.
2. The system shall be operated for a sufficient period to time to determine that the system is in proper working order.
3. For operated gate systems – test and explain safety features:
    a. Each system feature and device is a separate component of the gate system.
    b. Read and follow all instructions for each component.
    c. Ensure that all instructions for mechanical components, safety devices and the gate operator are available for everyone who will be using the system.
    d. The warning signs shipped with the gate operator must be installed in prominent position on both sides of the gate.
    e. Ensure the Owner is clear with regard to the safety point concerning the basic operational guidelines of the safety features of the gate operator system. These safety points are listed in the gate operator manual and must be read prior to system use.

3.8 GROUNDING

A. Grounding: Ground fencing in accordance with applicable requirements of IEEE c2-90, National Electrical Safety Code.

B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.

3.9 FIELD QUALITY CONTROL

A. Gate Tests: Prior to acceptance of installed gates and gate operator systems, demonstrate proper operations of gates under each possible open and closed condition specified.

3.10 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

3.11 CLEANING

A. Clean up debris and unused material and remove from the site.

END OF SECTION

SECTION 15055

STEEL PIPE (AWWA C200 MODIFIED)

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section will govern the installation of steel pipe, six (6) inches in diameter and larger, complete in place. Steel pipe shall be installed to the applicable provisions of the SAWS' Standard Specifications for Water Works Construction and/or conforming to AWWA C200. Specials shall be provided as specified in Section 15056 Steel Pipe Fabricated Specials.

B. A single Pipe Manufacturer shall be responsible for furnishing all the mortar-lined and polyurethane-coated steel pipe and smaller diameter appurtenant steel pipe. Manufacture of steel pipe and specials shall be under the direction and management of one steel PIPE Manufacturer only. This does not prevent a separate supplier from manufacturing specials or fittings; however, all Work shall be the responsibility of one manufacturer of the water piping. The responsibility of the Pipe Manufacturer shall include, at a minimum:

1. Certify all pipe, fittings and specials are being manufactured in full accordance with the Contract Documents.
2. Manage the design and fabrication of the pipe and specials.
3. Prepare and submit all submittal information and shop drawings.
4. Make any corrections that may be required to the submittal information and shop drawings.

C. All steel pipe shall be coated and lined as indicated below with welded joints.

1. Interior Lining:
    a) All pump suction piping shall be lined with epoxy. All other buried piping can be either epoxy lined or cement mortar lined.
2. Exterior Coating:
    a) Buried steel water pipe shall be polyurethane coated with welded joints.
    b) Above ground steel water pipe shall be coated with an epoxy primer and polyurethane top coat.

D. As part of the CONTRACTOR's Bid Documents, the Contractor shall submit the submit the following manufacturer information. Verification of items below will be conducted as part of the Bid Document review process for steel pipe and the CONTRACTOR'S preliminary schedule. Qualifications shall include the following:

1. Years of Experience. Submit written verification that the Pipe Manufacturer has been producing ANSI/AWWA C200 pipe with similar coatings and linings as indicated herein and similar design pressure as this project for a minimum of five (5) years.

2. Project Experience. Submit written verification that the Pipe Manufacturer has provided pipe for at least three (3) similar type projects of similar size, with wall thickness of 0.25”or greater. Submit reference names, telephone numbers, and description of projects for pipe conforming to ANSI/AWWA C200 and this requirement. Descriptions for applicable projects shall include, but not be limited to, length, diameter, wall thickness, lining and coating, steel metallurgy, location of facility where pipe was manufactured/fabricated and key plant personnel involved with the Work.

3. Certifications. Submit written verification that the Pipe Manufacturer is certified by either the Steel Plate Fabricator’s Association (SPFA) Quality Assurance Program or International Organization for Standardization (ISO) 9001.

4. Personnel Qualifications. Submit names and qualifications of current plant personnel to be used to manufacturer/fabricate pipe for the Work and the experienced manufacturer’s representative proposed for onsite observation. Manufacturer’s representative shall be as specified in Section 01300 – Submittals.

5. Submit written verification from the Pipe Manufacturer demonstrating compliance with the production and delivery schedule of the pipe as indicated in the Contractor’s preliminary schedule.

1.02 RELATED SECTIONS

A. The following is a list of related sections. Other sections may also apply.

1. Section 01300 – Submittals
2. Section 01640 – Manufacturer’s Field Services
3. Section 02220 – Earthwork
4. Section 09911 – Polyurethane Coating for Steel Pipe
5. Section 15056 – Steel Pipe Fabricated Specials
6. Section 15085 – Water Pipeline Testing

1.03 REFERENCES

A. The following is a list of related standards. Other standards may also apply.

1. AWWA C200: Steel Water Pipe 6 inches and larger

2. AWWA C203: Coal-Tar Protective Coatings and Linings for Steel Water Pipelines – Enamel and Tape – Hot Applied

3. AWWA C205: Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe – 4 in and Larger – Shop Applied.

4. AWWA C206: Field Welding of Steel Water Pipe

5. AWWA C207: Steel Pipe Flanges for Waterworks Service – Sizes 4 inch through 144 inches

6. AWWA C208: Dimensions for Fabricated Steel Water Pipe Fittings

7. AWWA C210: Standard for Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.

8. AWWA C216: Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.

9. AWWA C222: Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings

10. AWWA M11: Steel Water Pipe – A Guide for Design and Installation

1.04 ABBREVIATIONS

A. DR: Dimension Ratio

B. NPS: Nominal Pipe Size followed by the size designation

1.05 QUALIFICATIONS

A. Fabricator shall be ISO-9001 or SPFA certified with five years' experience in the manufacture of steel pipe, fittings, and coatings specified. All pipe, coatings, linings, and fittings shall be fabricated by one company at one facility for quality control purposes.

1.06 SUBMITTALS

A. Contractor shall submit all certified affidavits of compliance for each portion of work for which Contractor is requesting payment before acceptance of such payment will be made. Performing and paying for sampling and testing as necessary for the certified affidavits of compliance are the Contractor's responsibility. The following certified affidavits of compliance are required for all pipe and other products or materials furnished under this Section, as specified in AWWA C200 and in accordance with Section 01300 – Submittals.

1. List cross-referencing pipe mark numbers with pipe sequence numbers, heat numbers and can numbers.

2. Hydrostatic test reports.

3. Results of production weld tests.

4. Sand, cement and mortar tests.

5. A Certified Test Report from the polyurethane coating manufacturer indicating that the coatings were applied in accordance with manufacturer's requirements and in accordance with this Section and Section 09911 – Polyurethane Coating for Steel Pipe on all pipe, fittings and joints made in the factory and in the field.

6. Coating applicator shall submit a typical QA/QC inspection form during the submittal process.

7. The Coating applicator shall submit daily inspection reports within one week of the inspection date to the Owner.

8. Pipe temperature complies with Contract Documents prior to placing backfill material and prior to and during welding temperature control joints.

9. All welds were performed in conformance with these Contract Documents.

10. Provide certification stating that the instructions and requirements of the lining and coating materials manufacturer will be followed and that the lining and coating materials manufacturer is acceptable to the Pipe Manufacturer.

C. Drawings, specifications, and other data showing complete details of the design, fabrication, construction, field locations and elevations, and installation of pipe, fittings, specials and connections, together with complete data covering all materials proposed for use shall be submitted to the Owner for review, approval, or other appropriate action prior to beginning pipe laying operations. All submittals shall be in accordance with the provisions of Section 01300 - Submittals. The drawings and data shall include but not be limited to the following for each size and class of pipe:

1. Shop drawings, complete with material, grade, and pressure class for all pipe, fittings and couplings for all joints, coatings, and appurtenances will be submitted. Detailed catalog and engineering data sheets and product delivery schedules shall be submitted for all components.

2. Complete erection drawings for all buried and exposed piping shall be submitted. The drawings shall show and identify the pipe, pipe joint lengths, fittings, couplings, joint harnesses, restrained joint lengths, wall sleeves in vaults, wall castings for vaults, miscellaneous supports, and other miscellaneous details as required.

3. Drawings showing the location and details of bulkheads for hydrostatic testing of the pipeline and details for removal of test bulkheads and repair of the lining.

4. Erection procedures for installing all piping. The procedures shall cover in detail, the preparation and making of push-on, mechanical, flanged, or welded couplings; measures to ensure the integrity of the interior pipe lining and the exterior protective coating; the method of backing up and sealing the annular spaces in pipe sleeves; and the installation and adjustment of supports.

5. Protective coating schedules that show shop and field surface preparations, materials, methods of application, dry thickness, and tests for coating defects.

6. Procedures for testing the piping and arrangements for obtaining and disposing of the water for the tests shall be fully described. Details of bulkheads, flanges, or caps for the testing shall be included in the submittal.

7. Production schedule for manufacturing/fabricating pipe for the Work as part of the Contractor's schedule.

8. Joint and pipe wall construction details which indicate the type and thickness of cylinders; the position, type, all size and area of wire or other reinforcements; coating and lining holdbacks; manufacturing tolerances; maximum angular joint deflection limitations; and all other pertinent information required for the manufacture and installation of the product. Joint details and design calculations shall be submitted for all welded joint types, including beveled ends for alignment conformance and deep butt strap joints required for control of temperature stresses as applicable. The pipe manufacturer shall submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In absence of a history of field performance, the results of a test program shall be submitted.

9. Pipe design criteria shall include, but shall not be limited to, minimum pipe diameter, minimum pipe wall thickness, pressures, external loads, yield strength, allowable fiber stress, longitudinal stress for restraint, temperature changes, lining and coating materials, and other factors used for pipe design.

10. A table shall be provided that includes the following information: E', K, soil weight, deflection lag factor, external load(s), and percent deflection from minimum to maximum cover depth shown in the Steel Pipe Schedule in one foot increments covering each size and class of pipe. Two (2) tables shall be submitted for each size and class of pipe, one with live loads and one without live loads.

11. Detail drawings indicating the type, number and other pertinent details of the slings, stulling, and other methods proposed for pipe support and handling during manufacturing, transport, and installation. Submit documentation confirming that the handling and support system has been designed and sealed by a registered professional engineer, licensed in the State of Texas. The recommended methods of handling and placement of the pipe shall be submitted to the Owner as a record copy prior to transporting of any pipe to the project site. All pipe handling equipment and methods shall be acceptable to the Owner.

12. For record copy, submit detailed drawings indicating loading and shipping procedures that are designed to minimize damage to coating.

13. Pipe Manufacturer to provide AutoCAD drawings of the pipe plan and profile layout sheets showing each joint of pipe and all appurtenances to the same coordinate system as used on the Drawings.

D. Submit copies of the method that the Contractor proposes to use for measuring deflection of pipe joints to the Engineer and Owner for review. Submit copies of agreed written method for taking pipe deflection measurements with measurements made no sooner than five (5) days and no later than 21 days after backfilling operations are complete.

E. Product Data: Submit manufacturer's catalog information on pipe material and fittings.

F. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions for pipe sizing methods and calculations used.

G. Design calculations:

1. Wall thicknesses for external loading, special loading and internal pressure to be signed and sealed by a register professional engineer in the State of Texas.

H. Ground Profile and Utility Locations.

1. Prior to preparation of line layouts Contractor shall verify the existing ground profile and the location and depth of all underground utilities using centerline stakes set by the Contractor at no less than 100 feet intervals.

2. Ground profile and utility locate information shall be provided to the Owner through the submittal process. Any plans sheets that are modified due to adjustments in pipeline profile shall be reissued to the Contractor.

I. Welding Information. Submit the following prior to performing any Work:

1. Full and complete information regarding location, type, size and extent of all welds with reference called out for Welding Procedure Specifications (WPS) numbers shall be shown on the Shop Drawings. The Shop Drawings shall distinguish between shop and field welds. Shop Drawings shall indicate by welding symbols or sketches the details of the welded joints and the preparation of parent material required to make them.

2. Written welding procedures for shop and field welds including Welding Procedure Specifications (WPS) and Procedure Qualification Records (PQR).

3. Written nondestructive testing (NDT) procedure specifications and NDT personnel qualifications.

4. Credentials of the Contractor's certified welding inspectors and quality control specialist for review prior to starting any welding in the shop or field.

5. Welding map showing the sequence of welds for all field welds.

6. Written weld repair procedure for each type of shop and field weld proposed for use on the project.

7. Written rod control procedure for shop and field operations demonstrating how the Contractor intends to maintain rods in good condition throughout the Work.

8. Submit shop drawings and welding information together as a complete package. Welding Procedure shall be approved by the Engineer and Owner before welding of joints begin.

9. Submit the following as the work is performed:

a. Certified Test Reports for the NDT data for each shop-welded and field-welded joint. This data shall include all testing on each weld joint, including re-examination of repaired welds, using visual, radiographic, magnetic particles, dye penetrant examination, ultrasonic or air test examination methods specified. Test data shall be reviewed and signed by the welding inspector.

b. Certified Test Reports for daily welder logs for field and shop welding. Logs shall list all welders to be used for the Work, the welding process, position, welder stamp number, certification date and certification status for each welder, test documentation, and Welder Procedure Specification.

J. Control of Temperature Stresses:

1. Submit plan and installation instructions to avoid the accumulation of expansion and contraction to minimize temperature stresses in the pipe wall during installation. The plan and installation instructions shall include the sequencing of events during and after installation, including backfilling and welding, use of a lengthened bell, and other methods to control temperature stresses in the pipeline.

2. Submit the proposed sequencing of events or special techniques to minimize distortion of the steel as may result from shop welding procedures. Submit a plan for monitoring pipeline temperatures.

K. Qualification Statement:

1. Submit qualifications for manufacturer, installer, and licensed professional.

2. Submit manufacturer's approval of installer.

1.07 QUALITY CONTROL AND ASSURANCE

A. Inspection. All pipe, linings, coatings, welds and related work shall be subject to inspection at the place of manufacture and/or the place the Work is performed in accordance with the provisions of ANSI/AWWA C200 as supplemented by the requirements herein. The Contractor shall notify the OWNER in writing not less than 14 calendar days prior to the start of any phase of the pipe manufacture, welding, lining, coating, testing or field operations. The Contractor may provide access to manufacturers' site visits in accordance with the Contractors Quality Control Plan. The Pipe Manufacturer will be required to present and demonstrate compliance with all manufacturer specifications required in this project. Personnel at the plant involved in this Project shall be in attendance. All aspects of pipe manufacture will be reviewed: welding, cement mortar lining, polyurethane coating, testing, handling, and loading and shipping.

1. The Contractor shall provide a certified welding inspector(s) (CWI) for all field welding as specified in ANSI/AWWA C206 and the Pipe Manufacturer shall provide a certified welding inspector(s) (CWI) for all shop welding as specified in ANSI/AWWA C200. The CWI shall visually inspect 100 percent of all welds, verify proper procedures are being followed using qualified welders and

supervise CONTRACTOR'S NDT. The welding inspector(s) shall submit written certification that all welds were performed in conformance with these Contract Documents in accordance with Contractor's QC Plan. All shop weld tests shall be reviewed and signed by the inspector(s).

2. All pipe and fittings will be inspected prior to unloading and upon delivery to project site. Any pipe not fully meeting these specifications will not be paid for as material on site until it is repaired to within these specifications.

B. Onsite Observation.

1. Polyurethane Coating Manufacturer. The Pipe Manufacturer shall provide services of the coating Manufacturer's representative and a representative from the Heat Shrink Joint Manufacturer for the initial installation to advise Contractor and Owner regarding installation, including but not limited to, handling and storage, cleaning and inspecting, coating repairs, field applied coating, heat shrink installation procedures and general construction methods and how they may affect the pipe coating. The Manufacturer's Representative shall be required to return if, in the opinion of the Owner, the coating or the Contractor's construction methods do not comply with Contract Documents. Cost for the Manufacturer's Representatives to return to the site shall be at no additional cost to the Owner.

C. Welder Qualifications .All welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the Welding Procedure Specification submitted and materials to be used. Welders shall be qualified by the Contractor under the provisions of ANSI/AWS D1.1 or ASME BPVC for shop welds and ANSI/AWS D1.1 for field welds. All welders shall have been certified within the last six months or shall provide a welding continuity log. All welders shall be certified to weld in all positions.

D. Shop Tests. Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of ANSI/AWWA C200, as applicable. The Contractor shall be responsible for performing and paying for said material tests. The Owner shall have the right to witness all testing conducted by the Contractor; provided that the Contractor's schedule is not delayed for the convenience of the Owner. In addition to those tests specifically required, the OWNER may request additional samples of any material including mixed concrete and lining and coating samples for testing by the Owner. The additional samples shall be furnished as part of the Work.

1. Weld Tests. Shop Nondestructive Testing (NDT) shall be performed for various weld categories in accordance with the requirements of ANSI/AWWA C200 and as specified herein. Testing shall include submitting written documentation of procedures per Section V ASME BPVC, and acceptable criteria shall be in accordance with Section VIII of the ASME BPVC.

a) Fillet Welds. Examine 100 percent of fillet welds using the magnetic particle inspection method.

b) In all hand welding, the metal shall be deposited in successive layers. The WPS shall describe the minimum weld to be placed in each pass. Each pass except the final one, whether in butt or fillet welds, shall be thoroughly cleaned to remove dirt, slag, or flux before the succeeding bead is applied. Each pass shall be thoroughly fused into the plates at each side of the welding groove or fillet and shall not be permitted to pile up in the center of the weld. Undercutting along the side shall not be permitted.

c) Welds shall be free from pin holes, non-metallic inclusions, air pockets, undercutting and/or any other defects.

d) Welds. PIPE MANUFACTURER'S certified welding inspector shall visually examine 100 percent of all welds.

e) In addition to weld tests, doubler pads shall be air tested as stated in ANSI/AWWA C206.

f) In addition to the tests required in ANSI/AWWA C200, magnetic particle weld tests on steel cylinders shall be conducted one time for each 5,000 feet of production welds and at any other times there is a change in the grade of steel, welding procedure, or welding equipment. Additionally, at least one set of tests per operator per work shift shall be performed.

g) Spiral weld seams shall be tested by the visible penetrant method of ASTM E 165 - Methods for Liquid Penetrant Inspection or magnetic particle inspection method of ASME Section VIII, Division 1, Appendix VI, for a minimum distance of 12 inches from each end of each joint after the spigot and bell are formed. Defects shall be repaired.

h) Coil splices shall be tested by the ultrasonic method in conformance with ASME Boiler and pressure vessel Cod, Section VIII, Pressure Vessels.

2. Hydrostatic Tests. After the joint configuration is completed and prior to lining with cement-mortar, each steel cylinder shall be shop tested and certified to a pressure of at least 75 percent of the yield strength of the pipe steel cylinder. Test pressure shall be maintained for a minimum of 2 minutes. Factory hydrostatic tests shall be submitted as Certified Test Reports.

3. Charpy Tests. Steel greater than or equal to 1/4-inch thickness used in production manufacturing of pipe and specials shall be tested for notch toughness using Charpy V-Notch tests in accordance with ASTM A370 - Test Methods and Definitions for Mechanical Testing of Steel Products. The test acceptance for full size specimens (10 mm by 10 mm size) shall be 25 feet-pounds at a test temperature of 30 degrees F; tests shall include three impact specimens and shall be conducted in the direction transverse to the final direction of rolling. Steel for pipe and specials shall be

qualified for notch toughness with Charpy tests as indicated for the specified steel.

a) Plate. Charpy tests shall be conducted on each plate as required in ASTM A20. Plates that do not qualify shall not be used in production of the pipe.

b) Coils. Test Outside diameter wrap of two coils per heat lot.

4. Shop Fit Test. To ensure that lap and bell and spigot joints may be fully assembled, that excessive annular space between spigots and bells does not exist, and that the pipe meets the requirements of ANSI/AWWA C200, the pipe fabricator shall perform a shop fit test on a minimum of five joints of each pipe size and joint type used. The joints to be tested shall be selected by the OWNER based on pipe measurements. The shop fit test shall join the pipe ends in the shop with the proposed adjacent pipe end. The pipe ends shall be match marked after shop assembly. Record the actual annular space, with the data to include as a minimum:

a) Maximum space at any point.

b) Minimum space at any point.

c) Space at 90-degree intervals - top, bottom and spring line on both sides.

E. Field Tests. The following field tests shall be required. Field testing shall not damage factory applied coating system.

1. Welded Joint Tests. Contractor's certified welding inspector shall perform a magnetic particle test and visually inspect all welds. All field-welded joints shall be tested by the Contractor using the magnetic particle inspection procedure conforming to the requirements of ANSI/ASTM E 709 "Standard Guide for Magnetic Particle Testing" and ASTM E 1444 "Standard Practice for \Magnetic Particle Testing" unless otherwise specified. Additionally, butt straps shall be air tested with low pressure from a threaded fitting between the welds as specified in Section 15056 - Steel Pipe Fabricated Specials (ANSI/AWWA C200, Modified).

2. Holiday Tests. Holiday tests shall be performed as specified in Section 09910 – Polyurethane Coating for Steel Pipe and shall be done prior to shipment. Provide certification for test results.

3. Mortar Coating Thickness Tests. Tests shall be performed on cylinders, specials, joints, and repairs. The Contractor shall furnish inspection devices that are calibrated and in good working condition for measurement of mortar coating thicknesses. These inspection devices shall be purchased by the Contractor and provided to Owner for approval prior to any delivery of pipe.

4. Pipe shall be measured for deflection at 25-foot intervals unless otherwise required by Owner. Monthly deflection report shall be submitted for the Engineer and Owner's review.

5. Hydrostatic pressure and leakage testing shall be as specified in Section 15085 – Water Pipeline Testing.

6. Coating thickness tests shall be performed on cylinders, specials, joints, and repairs. These inspection devices shall be as required as specified in Section 099101 – Polyurethane Coating for Steel Pipe.

1.08 DELIVERY, STORAGE, AND HANDLING

A. All water main piping shall be handled at all times with equipment designed to prevent damage to the interior and exterior coatings.

B. When making shipments, all chains, cables and hold-down equipment shall be carefully padded where in contact with the pipe. Unloading from trucks shall be done with care using slings and cables that will not harm the pipe and no pipe will be allowed to fall.

C. Gaskets will be stored in containers or wrappers to protect them from ozone and other atmospheric deterioration.

D. Pipe shall not be stored on rocks, gravel or other hard materials that might damage the coating. Pipe shall not be laid on asphalt without suitable padding at all contact points.

E. Stockpiled pipes shall be secured to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials.

F. Any pipe damaged during handling, transporting, storage or installation shall be repaired or replaced. Repairs must meet the approval of the Pipe Manufacturer, Engineer and Owner.

G. Pipe shall be inspected by the Contractor at the project site for damage. Any damage to the pipe, lining, or coating shall be repaired as directed if, in the opinion of the Engineer or Owner, a satisfactory repair can be made; otherwise, the damaged section shall be replaced at the sole expense of the Contractor.

H. No metal tools or heavy objects shall be permitted to come into contact unnecessarily with the finished coating.

1.09 EXISTING CONDITIONS

A. Field measurements: Verify field measurements prior to fabrication. Indicate field measurements on shop drawings.

B. Contractor shall field verify any existing piping to be replaced in the yard to determine the actual O.D. Based on the O.D., appropriate transitions needs to be provided to mate with the valves, flanges, etc. utilized in the field and the transition flanges fabricated to AWWA C200.

PART 2 PRODUCTS

2.01 GENERAL

A. The following pipe materials will be authorized for use in this project in the sizes shown below and as indicated in the Plans:

1. Steel Pipe – Pipe diameters equal to 6" and greater

B. Potable water main pipe, fittings, couplings, and appurtenant items shall be new, free from defects or contamination, and wherever possible, shall be the standard product of the manufacturer. All buried potable water main pipe shall be connected together using mechanical or push-on joints, except as otherwise specified. All potable water main pipes shall be manufactured in the USA.

C. Repair of Defects. Patching inserts, overlays or pounding out of dents will not be permitted. Repair of notches or lamination on second ends shall not be permitted. Damaged ends shall be removed as a cylinder, and the end properly prepared. Distorted or flattened lengths shall be rejected. A buckled section shall be replaced as a cylinder.

D. Steel piping shall have a pressure classification of at least 150 psi unless otherwise shown in the Plans. The pipe weight and classification shall be clearly indicated on the bell of each pipe section. In addition, all potable water main pipes shall be designed to withstand the service conditions shown in Table 1 – Design Service Conditions.

Table 1
Design Service Conditions

Service Parameter	Design Condition
(a) Maximum depth of cover	As shown in plans
(c) Maximum interior working pressure	All Steel Piping: 150 psi
(d) Field test pressure	225 psi
(e) Maximum vacuum pressure	-10 pounds per square inch
(f) Surge pressure	Maximum Surge Pressure to be 150% of the operating pressure
(h) Fluid temperature	70 degrees (F) with Δ t = 30 degrees F
(i) Soil unit weight	120 pounds per cubic foot

A. The pipe shall be of the diameter as shown on Drawings. Unless indicated otherwise, the inside diameter shall be considered the finished diameter after lining.

B. Pipe Wall Thickness. The pipe wall thickness shall be in accordance with ANSI/AWWA M11, except with a minimum wall thickness of 0.25", with zero minus tolerances or unless otherwise noted on the drawings. Pipe wall thickness shall be constant for the entire length of pipe section. In restrained lengths, the steel cylinder area shall not be progressively reduced from the point of maximum thrust to the end of the restrained length. The cement mortar lining shall not be used in the pipe wall stiffness calculations.

For pipe diameters up to 12-inches, the Contractor may substitute steel pipe per ASTM A53 "Welded and Seamless Steel Pipe" with a thickness known as Schedule 40 (standard weight).

C. Design (Working) Pressure. Unless otherwise indicated, the working (maximum steady state) and field hydrostatic test pressures shall be as indicated on the Drawings. The transient pressure (maximum total unsteady state) shall be 1.5 times the working pressure. Design in accordance with ANSI/AWWA C200 except that the design stress (using a safety factor of 2.0 to yield strength) shall not be greater than 21,000 psi at design working pressure nor shall the design stress (using a safety factor of 1.5 to yield strength) be greater than 75 percent of 42,000 psi or 31,500 psi for 42,000 psi steel pipe at design transient pressure. In restrained lengths, design hoop stresses shall not exceed 21,000 psi.

D. External Grout Pressure. The pipe in the tunnel and steel casing shall be designed for an external grout pressure of 15 psi. The stiffness of the mortar lining shall not be considered in the design.

E. Modulus of Soil Reaction. Design calculations which require a modulus of soil reaction (E') shall assume an E' of 1500 psi for trench backfill.

F. Bedding Constant. The bedding constant, K shall be 0.10.

G. Pipe Deflection. The requirements of Section 02200 EARTHWORK govern for the excavation and backfilling of trenches for laying steel pipe, fittings, and specials. Conformance with pipe deflection requirements shall be as set forth below.

1. Average allowable pipe deflection is limited to 2% for polyurethane and tape coated steel pipe. In no case shall a single measurement in any direction exceed 1.5 times the average allowable deflection. These measurements include the allowable tolerance for lining thickness.
2. Deflection measurements shall be made by the CONTRACTOR in the presence of the OWNER's representative. Method for taking measurements shall be agreed to by the OWNER and CONTRACTOR in writing prior to installing the first joint of pipe.
3. Average deflection shall be determined by averaging the pipe's measured vertical deflection as indicated below. Locations where measurements are taken shall be clearly marked on the interior of the pipe.
    a. For pipe joints 36 feet in length or less, measurements shall be taken at two locations, $^1/_4$-distance from each pipe end.
    b. For pipe joints longer than 36 feet, measurements shall be taken at three locations including $^1/_4$-distance from each pipe end and at the pipe midpoint.

4. If the average measured deflection at any joint or any single measurement fails to meet specifications, the entire joint shall be reworked in accordance with the manufacturer's recommendations and as directed by the ENGINEER at no additional cost to the OWNER. This may include uncovering the pipe and re-compaction of the pipe bedding, and repair of coating.

5. Installed pipe joints will also be examined for flat spots and internal lining stress cracks by the OWNER's representative. A flat spot is anything flat enough to cause lining damage. Lining damage shall be repaired in accordance with the manufacturer's recommendations and as directed by the OWNER at no additional cost to the OWNER. Repair of flat spots may include uncovering the pipe and re-compaction of the pipe bedding, and repair of the coating.

6. Where pipe has been reworked to comply with the deflection requirements, CONTRACTOR shall re-measure for deflection no earlier than seven days after the repaired pipe is backfilled. OWNER's representative will re-inspect for flat spots at this time.

7. No pipe installation shall be accepted until the entire installation is in compliance with the above deflection requirements.

8. All costs associated with measuring for pipe deflection and any repairs or rework associated with meeting these requirements shall be borne by the CONTRACTOR.

2.02 WELDED STEEL PIPE AND FITTINGS

A. Except as otherwise noted, steel pipe, fittings and specials shall be made of carbon steel plate conforming to ASTM A572 grade 42 or ASTM A36 with modified minimum yield strength of 42,000 psi and minimum tensile strength of 60,000 psi, or coil conforming to ASTM A1018 SS Grade 40 with minimum yield strength of 42,000 psi and minimum tensile strength of 60,000 psi or the chemical and physical requirements of ASTM A139 grade C, fabricated in accordance with AWWA C200. Steel made of Grade 45 or higher will not be allowed. When using spiral seams, coil splices shall be a minimum of two feet away from the ends of the pipe cylinder. Forming bells by rolling will not be allowed. The thickness shall be designed for 66 percent of minimum yield stress at hydrostatic test pressure. **Alternatively, pipe diameters up to 12-inches in diameter, shall conform to the requirements of ASTM A53, Type E or S, or ASTM A106, Grade B.**

B. Steel plates or coils shall be fine grained, fully killed, and manufactured using a continuous casting process. The steel shall also meet the maximum carbon equivalent of 0.45, as measured by AWS D1.1, Annex XI.

C. Joints shall be lap welded, butt-welded, flanged, or shouldered in accordance with AWWA C606, Type D (non-buried only), where required on the plans. To facilitate installation, field welded or mechanically coupled joints may be provided, but shall be kept to a minimum and their location shall be acceptable to the Engineer.

D. Welded Joints.

1. Field welded joints shall not be used in pipe smaller than 30 inches, except in locations where the interior coating can be satisfactorily repaired and inspected. In buried locations, field weld joints on pipe 30 inches in diameter and larger in accordance with AWWA C206. For pipe smaller than 30 inches, provide bell and spigot joints with rubber gaskets per AWWA C200 when joint restraint is not required, or sleeve type couplings that are harnessed when joint restraint is required. Field welded joints for 36 inch diameter and larger shall be single lap-welded joints except in thrust restraint areas the first joint at either side of the thrust point shall be double lap-welded (welded from inside and outside)Flanges shall only be used in buried piping for connections to valves and other appurtenances. Provide a harnessed flanged coupling adaptor to one side of all flanged valves and appurtenances.

E. Fittings and Specials. Whether or not indicated on the drawings, reinforcement for fittings and specials shall be designed by the pipe manufacturer in accordance with AWWA M11.

1. Specials shall include, but are not limited to fittings, closure pieces, bends, elbows, reducers, tees, wyes, bifurcations, crosses, outlets, manifolds, nozzles, steel pipe wall sleeves, bulkheads and other specials, piping and appurtenances fabricated from steel plate, sheet or coils as required to provide the Work, complete. Specials shall also include piping above ground or inside structures.

2. Specials shall be properly reinforced to withstand the internal pressure, both circumferential and longitudinal, and external loading conditions. Fittings and specials shall be equal to adjoining pipe in pressure and external loading design strength. Wall thickness for reducing sections shall not be less than the required thickness for the larger ends.

3. Fittings shall be fabricated from carbon steel in accordance with AWWA C208. Elbows shall have a maximum 22.5 degree miter section angle and a minimum of 3 sections. Wyes, tees, crosses, and outlets shall be reinforced in accordance with AWWA M11.

F. Flanges shall be in accordance with AWWA C207 Class D for operating pressures to 175 psi on 4 inch through 12 inch diameter, and operating pressures to 150 psi on diameters over 12 inches. Flanges shall be in accordance with AWWA C207 Class E for operating pressures up to 275 psi or Class F for pressures up to 300 psi. Drilling matches ANSI B 16.5 Class 250. Shop lining and coating shall be continuous to the end of pipe or back of flange. All flanges shall be welded slip on with no screw on flanges allowed.

1. Bolts for flanges located indoors and in enclosed vaults and structures shall be carbon steel, ASTM A307, Grade B for class B and D flanges and nuts shall be ASTM A563, Grade A heavy hex. Bolts for Class E and F flanges shall be ASTM A193 grade B7 and nuts shall be ASTM A194, grade 2 H, heavy hex.

G. Bolts for buried and submerged flanges and flanges located outdoors above ground or in open vaults shall be Type 316 SS conforming to ASTM A193, Grade B8M, Class 1 for class B and D flanges with ASTM A194, grade 8M nuts. For Class E and F flanges the bolts shall be ASTM A194 grade 2H nuts with bolt and nuts to be zinc plated in accordance with ASTM B633.

H. Gaskets shall be 1/8-inch thick, cloth-inserted rubber corrosive acid and alkali free for potable water and sewage service conforming to ANSI B16.21 and AWWA C207. Gaskets for potable water service shall be certified as suitable for chlorinated and chloraminated potable water; a certificate of gasket suitability shall be submitted. Flat faced flanges shall require full-face gaskets. Raised faced flanges shall require flat ring gaskets.

I. Small Branch Connections.

1. Branch connections less than 1-inch. A 1-inch outlet shall be provided and reducing bushings used as needed.

2. Branch connections 2½ inch and smaller shall be made with welding fittings with threaded outlets.

3. Branch connections sized 3 through 12 inches shall be made with pipe nipples or by welding fittings with welded outlets. Pipe nipples and welding fittings shall be welded to the pipe shell and reinforced as needed to meet design and testing requirements.

4. Small branch connections shall be located to not interfere with joints, supports, or other appurtenances and shall be provided with caps or plugs to protect the threads during shipping and handling.

I. Cement Mortar. Cement for mortar shall conform to the requirements of ANSI/AWWA C205; provided, that cement for mortar lining shall be Type I or II per ASTM C150. Cement shall not originate from kilns which burn metal-rich hazardous waste fuel, nor shall a fly ash, bottom ash or pozzolan be used as a cement replacement. Sand shall be silica base and shall not leach in water. Sand shall be in accordance with ANSI/AWWA C205. Cement mortar linings shall be dense and smooth without bumps, blisters, ridges, or spalling, to the satisfaction of the OWNER. All rough spots shall be smoothed over with a rubbing stone, or other method, to the satisfaction of the OWNER. Epoxy bonding agent shall be in accordance with ASTM C881, Type II, moisture insensitive and suitable for service conditions. Latex admixture shall be Euclid “Euco Flex-Con” or Sika “SikaLatex”. Admixture shall contain no calcium chloride. The minimum lining thickness shall be in accordance with ANSI/AWWA C205. The pipe shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing, roughness and mortar spatter. Cracks shall be subject to repair within the guidelines of ANSI/AWWA C205. Cement mortar for patching shall be the same materials as the mortar for machine lining, except that a finer grading of sand and mortar richer in cement shall be used when field inspection indicates that such mix will improve the finished lining of the pipe. The nominal inside diameter after lining shall not be less than the diameter shown on the Drawings, allowing for tolerances according to ANSI/AWWA C200 and C205.

J. Exterior steel surfaces for buried pipe and fittings shall polyurethane coated.

1. Polyurethane Coating. The coating system for straight line pipe and fittings shall be in accordance with ANSI/AWWA C222, field joints shall be in accordance with ANSI/AWWA C216 as modified by Section 09911 - Polyurethane Coating.

K. Liquid Applied Epoxy Coating:

1. Provide liquid epoxy primer and lining in all cement mortar lined metallic pipe at insulating joints for a minimum of two feet on each side of the insulated joint.

2. Epoxy coatings shall be NSF approved coatings suitable for potable water contact in accordance with ANSI/NSF Standards 60 and 61.

3. Epoxy shall be applied over the cement mortar lining where specified for the pipeline lining material.

4. Prepare the cement mortar lining by abrasive blasting to remove all laitance and provide a surface profile.

5. Cement mortar shall be allowed to cure for a minimum of 15 days prior to surface preparation and coating application or seven (7) days with steam curing.

6. Mortar lining shall be dry when epoxy lining is applied.

L. Dielectric Fittings and Dielectric Couplings: Provide between dissimilar metals and between old and new steel pipes.

PART 3 EXECUTION

3.01 GENERAL

A. Care and Handling of Materials: All materials shall be carefully handled in all steps of fabrication, storing, loading, and transporting, unloading, storing at the site, and installation, using the means and following the procedures submitted with the approved shop drawings. Pipe slings used during handling and tie-down straps during transit shall not be less than 4-inch wide flat fiber or plastic straps. During storage and in transit, pipe (8-inch diameter and larger) shall be rested on saddles or on another support system approved by the OWNER, which will ensure freedom from damage of the barrel, interior lining, and exterior coating. A minimum of three saddles will be used during transit.

B. Installation: All potable water main pipe shall be installed in accordance with the drawings and procedures submitted with the approved shop drawings. The interior of the pipe, fittings and couplings shall be kept clean and free from contamination during installation. All pipes shall be carefully placed and supported at the proper lines and grades and where practical shall be sloped to permit complete drainage. Piping runs shown on the plans shall be followed as closely as possible. If relocation is required, they shall be approved by the Owner.

C. Verification of Dimensions: All dimensions essential to the correct locations of the pipe, or fit of piping at equipment and valves, or to the proper orientation of pipe sleeves and wall castings, or to the avoidance of obstructions or conflict with other improvements, shall be accurately determined by the CONTRACTOR prior to the fabrication of the piping involved. All required changes from the nominal location shown on the drawings shall be made by the CONTRACTOR and shall be included as a part of the work.

D. Installation: All potable water main pipe, fittings, couplings, and appurtenant items shall be in proper alignment. Assembly and installation shall not result in placing any undo alignment strains or stresses on any flanges or couplings. When connecting flanged joints care shall be taken in bolting together joints to avoid placing restraint on the opposite end of the piece, which would prevent pressure from being evenly and uniformly applied to the flanged gasket. The pipe or fitting must be free to move in any direction during the installation of bolts. Bolts shall be gradually tightened in a crisscross pattern, to ensure a uniform rate of gasket compression around the entire flange.

Mechanical couplings shall be carefully installed in accordance with the manufacturer's recommendations. A space of at least ¼-inch, but not more than ¾-inch, shall be left between the pipe ends. Pipe and coupling surfaces in contact with the gaskets shall be clean and free from dirt and other foreign matter during assembly. All assembly bolts shall be uniformly tightened so the coupling is free from leaks, and all parts of the coupling are square and symmetrical with the pipe. Wenches used in bolting shall be of a type and size recommended by the coupling manufacturer.

3.02 BURIED PIPING

A. Installation: All buried pipe, 30 inches and larger shall be welded steel unless otherwise specifically shown in the drawings. In thrust restrained areas the first joint at either side of the thrust point **(**eg. fittings greater than 5 degrees, tees, crosses, dead ends, valves, etc) shall be double lap welded from inside and outside. Buried pipe less than 30 inches shall be steel with sleeve type couplings, harnessed when joint restraint is required, or bell and spigot joints with rubber gaskets. Buried piping shall be installed according to the lines and grades shown in the plans. All trenching, bedding, and backfilling shall conform to the requirements specified in Section 02200 - Earthwork. Other requirements include:

1. Open ends of the pipe shall be secured when the work is not in progress.
2. Piping shall be installed when trench and weather conditions are suitable. No pipe shall be placed in standing water, and the responsibility for diverting drainage and de-watering all trenches, including meeting all safety requirements shall be borne by the CONTRACTOR.
3. All pipe in place shall be approved by the Owner as to line, grade, bedding, and proper joint construction prior to backfilling.

B. Joints: Care shall be taken to keep pipe in correct alignment when making joints. The fitting of piping to valves, wall castings, and other appurtenances shall be worked out in advance of installation to ensure correct orientation of the mating ends and bedding of approach piping. Other requirements include:

1. The maximum deflection in bell and spigot potable water main pipe joints shall not exceed 75 percent of the manufacturer's recommendations.
2. All underground pipe shall be restrained in accordance with SAWS standard 95-10, latest edition.

3. Bolts and other exterior surfaces of buried joints, rods, and couplings shall be given a 20 mil coating of KOPR-KOTE High Temp Anti-Seize or approved equal.

4. When interior joints are protected with mortar, the procedure for mortar placement shall be as follows. Prior to the placing of mortar, any dirt or trash which has collected in the joint shall be cleaned out and the surfaces of the joint space shall be moistened with water by spraying or brushing with a wet brush. The inside joint recess at the bell end of 33-inch and smaller pipe shall be filled immediately prior to placing the pipe together by buttering the bell recess with mortar. After the joint is engaged, the joint mortar of pipe 18-inch in diameter and smaller shall be smoothed and cleaned with a swab, and the joint mortar of pipe larger than 18-inch pipe shall be finished off smooth by hand trowel. The inside joint recess of pipe larger than 33-inch shall be filled with mortar and finished smooth after the joint is engaged. Careful inspection shall be made of each joint to insure a smooth, continuous interior surface.

5. When the exterior joints are protected with mortar, the procedure for mortar placement shall be as follows:

    a. A grout band shall be placed around the pipe and positioned to straddle the joint recess. The band shall be of sufficient length to essentially encircle the pipe and shall be secured in such a manner that joint mortar will be contained with little or no leakage.

    b. For raised-bell (lined cylinder C301) pipe, there shall be no additional bedding or backfill material placed on either side of the pipe until after the mortar band is filled and the mortar has mechanically stiffened. For all other (flush bell) concrete pressure pipe, bedding and backfill may be placed and consolidated to approximately three-fourths the height of the pipe before the band is filled to provide support for the band to contain the weight of the mortar.

    c. The band shall be completely filled with mortar in one operation by filling from one side only until the mortar rises on the opposite side, and then rodded or agitated on both sides of the pipe alternately to settle the mortar. The mortar shall then not be agitated for at least 15 minutes to allow excess water to seep through the grout band and to allow the mortar to mechanically stiffen. After this period more mortar shall be added, if necessary, to fill the joint completely.

    d. The gap at the top of the joint band shall be protected from penetration of backfill into the mortar either by allowing the mortar to stiffen, or by capping with a stiff mortar mix, or by covering with a structurally protective material. The band shall not be removed from the joint.

    e. The mortar used at joints shall consist of one part Portland cement to no more than 3 parts clean sand mixed with water. Interior joint mortar shall be mixed with as little water as possible so the mortar will be very stiff but workable. Exterior joint mortar shall be mixed with water until it has the consistency of thick cream. During periods of cold weather the joint mortar shall be adequately protected from freezing.

C. Restraint: All push-on and mechanical joint tees, Y-branches, bends, and plugs which are installed in buried piping shall be provided with suitable anchors, joint harness, or other acceptable means for preventing movement of the pipe caused by internal pressure. Thrust blocking shall not be used alone, a restrained joint pipe system must be used which adequately resists thrust. Shop drawings will include a sealed thrust resistance design and a restraint length calculation for restraints at the pipe joints prepared by a registered professional engineer licensed in the State of Texas.

D. Cover: Unless otherwise shown, all potable water piping shall have a minimum cover of 5 feet.

3.03 ABOVE GROUND PIPING

A. Installation: All above ground piping shall be welded steel pipe unless otherwise specified in the plans. All piping shall be installed in accordance with the erection drawings and the erection procedure submitted with the approved shop drawings. Horizontal piping shall be run parallel to building walls and shall be level, except where otherwise shown. Parallel lines shall be grouped on the same horizontal or vertical plane wherever possible. Vertical piping shall be plumb and the entire piping configuration shall provide adequate clearances for painting and maintenance. Piping shall clear obstructions, preserve headroom, and keep openings and passageways clear. If structural difficulties or other work prevent the running of pipes or the setting of equipment at the point indicated on the drawings, the necessary minor deviations therefrom, as determined by the CONTRACTOR and approved by the Owner, will be allowed. All changes will be shown on the record drawings.

B. Joint Installation: Installation of joints and couplings shall conform to the following:

1. Joints and couplings shall be made in accordance with the specified requirements made part of the erection procedure submitted by the CONTRACTOR and approved by the Owner. The minimum distance between the harness clips for flexible couplings shall be a minimum of two (2) times the dresser length plus 12 inches.

2. Pipe threads shall be made in accordance with the requirements of ANSI B2.1, and shall be cut full and free from torn or ragged surfaces. No more than 3 threads on the pipe at any joint shall remain exposed after installation. Threaded joints shall be established with Teflon tape or joint compound applied to the male ends only. The use of thread cement or caulking will not be permitted.

3. Flanged joints shall be made with gaskets centered in the joint. Bolts, studs, and nuts shall be lubricated with graphite or oil so that the nuts can be turned by hand. Care shall be taken to prevent excessive initial tension to the bolt and studs so that the tension applied is as nearly uniform as possible. The rust preventative compound applied to the faces before shipment shall be removed before installation.

2. Mechanical coupling type joints of the sleeve, grooved mechanical, split sleeve, and flanged coupling adapter types shall be made in accordance with the manufacturer's printed instructions.

C. Pipe Sleeves: All piping which will pass through walls and slabs shall be provided with pipe sleeves with the annular space sealed or with wall castings. The CONTRACTOR shall provide the wall sleeves and castings for insertion into the concrete work and shall verify their correct setting prior to concrete placement. Sealing of the wall sleeves shall be made with mechanical link seals, appropriately sized for the through-pipe. Installation of the link seal shall made in accordance with recommendations of the manufacturer.

D. All above ground piping and valves shall be exterior coated as detailed in Section 09900 – Painting and Coatings.

END OF SECTION

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SECTION 15056

STEEL PIPE FABRICATED SPECIALS
(ANSI/AWWA C200, MODIFIED)

PART 1 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall provide fittings, closure pieces, bends, elbows, reducers, tees, wyes, bifurcations, crosses, outlets, manifolds, nozzles, steel pipe wall sleeves, bulkheads, other specials, piping and appurtenances fabricated from steel plate, sheet, or coils and pipe above ground, inside structures complete in place, and pipe encased in concrete, in accordance with ANSI/AWWA C200, C208 and AWWA Manual M11 as modified by the Contract Documents. Steel pipe shall be provided as required in Section 15055 – STEEL PIPE (AWWA C200 MODIFIED).

B. The manufacturer of the steel pipe shall be made responsible for furnishing all the specials. Manufacture of steel pipe and specials shall be as specified in Section 15055 – STEEL PIPE, (AWWA C200 MODIFIED).

C. As part of the CONTRACTOR's Bid Documents, submit the qualifications for the specials manufacturer/fabricator. Qualifications of the specials manufacturer/ fabricator shall be as specified in Section 15055 – STEEL PIPE, (AWWA C200 MODIFIED).

D. Fabrication. All specials shall be fabricated in the shop. No field fabrication of specials will be allowed unless specifically accepted by the OWNER. Approval will be based on clear demonstration by the manufacturer/fabricator that the manufacturer/fabricator has the appropriate equipment to mobilize to construct the specials in accordance with these Contract Documents for shop fabrication, including holding the appropriate tolerances, and performing the indicated testing.

1.02 RELATED WORK

A. Section 01330 SUBMITTALS

B. Section 01400 QUALITY CONTROL

C. Section 02200 EARTHWORK

D. Section 03300 CAST-IN-PLACE CONCRETE

E. Section 099101 POLYURETHANE COATING FOR STEEL PIPE

F. Section 15055 STEEL PIPE, (AWWA C200 MODIFIED)

G. Section 15085 WATER PIPELINE TESTING

1.03 SUBMITTALS

A. Certified Affidavits of Compliance. The CONTRACTOR shall submit certified affidavits of compliance for all steel pipe fabricated specials and other products or materials furnished under this Section. The requirements of Section 15055 – STEEL PIPE, (AWWA C200 MODIFIED) shall apply.

B. Shop Drawings. The CONTRACTOR shall submit shop drawings and line layout diagrams of all steel pipe fabricated specials, in accordance with Section 01330 – SUBMITTALS. All submittals required for steel pipe and related work as listed in15055– STEEL PIPE, (AWWA C200 MODIFIED) shall also be required for specials including the following:

1. Shop drawings shall indicate the type, size and location of all reinforcement pieces.
2. Detailed design drawings shall also be submitted for reinforced fittings and shall include developed plans or cut-out patterns, dimensioning of all fabricated pieces and welding requirements. The CONTRACTOR shall provide such detailed information for all reinforced fittings.
3. Design criteria shall be submitted to the OWNER for review prior to manufacture of steel pipe fabricated specials.
4. Pipe Manufacturer's Qualifications. Furnish a copy of pipe manufacturer's certification by Steel Plate Fabricator's Association (SPFA), International Organization for Standardization (ISO) 9001 or Lloyd's Register Quality Assurance Limited (LRQA) and documentation of manufacturer's experience in fabricating ANSI/AWWA C200 pipe.

1.04 QUALITY CONTROL AND ASSURANCE

A. Inspection. All specials shall be subject to inspection at the place of manufacture/ fabrication as specified in Section 15055 STEEL PIPE, (AWWA C200 MODIFIED). A certified welding inspector shall be provided for shop fabrication work and shall have the responsibilities outlined in Section 15055 STEEL PIPE, (AWWA C200 MODIFIED).

B. Onsite Observation. Onsite observation shall be as specified in Section 15055 STEEL PIPE, (AWWA C200 MODIFIED).

C. Welder Qualifications and Welding Procedure Specifications (WPS). All welder performance qualifications and WPS shall be in accordance with Section 15055 STEEL PIPE, (AWWA C200 MODIFIED).

D. Shop Tests. The CONTRACTOR shall be responsible for performing and paying for material shop tests. The OWNER shall have the right to witness all testing conducted by the CONTRACTOR, provided that the CONTRACTOR'S schedule is not delayed for the convenience of the OWNER. In addition to those tests specifically required, the OWNER may request additional samples of any material including mixed concrete and lining and coating samples for testing by the OWNER. The additional samples shall be

furnished as part of the work. Testing shall be performed before joints have been coated or lined.

1. Weld Tests. All welds shall be non-destructive tested at the specials fabricator's facility as specified below for various weld categories. Testing shall include submitting written documentation of procedures per Section V, and acceptance criteria shall be in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code (BPVC).

    a. Butt Joint Welds. Spot radiographically examine pipe in accordance with paragraph UW-52 of the ASME Boiler and Pressure Vessel Code Section VIII, Division 1, or they shall be 100 percent ultrasonically examined.

    b. Fillet Welds. Examine 100 percent of all fillet welds using the magnetic particle or dye penetrant inspection method.

    c. Groove Welds. Ultrasonically examine 100 percent of all groove welds that cannot be readily radiographically spot examined.

    d. Welds on pipe seams for previously successfully tested straight pipe do not need to be retested.

    e. All Welds. Pipe manufacturer's certified welding inspector shall 100 percent visually examine each pass of all welds as a minimum.

    f. Butt strap joints shall have an inside and outside weld and shall be air tested. Air test shall be low pressure from a $^1/_4$-inch threaded fitting between the welds. Air test pressure shall be 15 psi for 10 minutes with no loss of air pressure.

2. Hydrostatic or Weld Tests. If specials have been fabricated from untested straight pipe, they shall be either tested per section 1.04, D. 1. or hydrostatically tested with a pressure equal to 1-1/2 times the design working pressure shown on the Drawings. If specials have been fabricated from successfully tested straight pipe, no additional hydrostatic test is required unless otherwise indicated. In no case shall shop test pressure be less than 150 psi. All fittings with crotch plates shall be either tested per section 1.04, D.1. or hydrostatically tested as indicated regardless of whether or not the straight pipe sections used were previously tested. . For crotch plate reinforcement, postweld heat treatment will be required if the reinforcing members are thicker than 1.25 inches in conformance with Table UCS-56 of paragraph UCS-56 of ASME Code; for crotch plate thicknesses between 1.25 and 1.5 inches postweld heat treatment will not be required if preheat is applied at a minimum temperature of 200^0 F during welding.

E. Field Testing. Field testing shall conform to the requirements of Section 02643 WATER PIPELINE TESTING.

PART 2 PRODUCTS

2.01 GENERAL

A. Markings. Markings shall be as specified in 02571 STEEL PIPE, MORTAR-LINED (AWWA C200 MODIFIED). In addition, a mark indicating the true vertical axis of the special shall be placed on the top and bottom of the special

B. Specials. Specials shall include, but are not limited to fittings, closure pieces, bends, elbows, reducers, tees, wyes, bifurcations, crosses, outlets, manifolds, nozzles, steel pipe wall sleeves, bulkheads and other specials, piping and appurtenances fabricated from steel plate, sheet, or coils and pipe above ground, inside structures complete in place, and pipe encased in concrete as required to provide the work complete.

2.02 MATERIALS

A. Steel. Steel for specials shall conform to the requirements of Section 15055 STEEL PIPE, (AWWA C200 MODIFIED).

B. Lining. Specials shall be lined using the same materials for straight pipe as specified in Section 02571 STEEL PIPE, MORTAR-LINED (AWWA C200 MODIFIED).

C. Coating. Specials shall be coated as specified in Section 9910 POLYURETHANE COATING.

D. Access Manholes. Access manholes with covers shall be as shown on Drawings, installed during fabrication and not in the field. No temporary utility access penetrations shall be allowed. All threaded outlets shall be forged steel suitable for 3,000 psi service and shall be as manufactured by Vogt or equal.

E. Outlets, Tees, Wyes and Crosses.

1. Outlets 12-inch and smaller shall be fabricated from ASTM A53, Type E or S, Grade B, standard weight steel pipe in the standard outside diameters, i.e., 12-3/4-inch, 10-3/4-inch, 8-5/8-inch, 6-5/8-inch and 4-1/2-inch. Unless otherwise shown, wall thickness and collar reinforcing shall be designed by the pipe manufacturer as specified. Collars shall be manufactured with the same steel as specified for the mainline piping.
2. In lieu of collar reinforcement, pipe or specials with outlets may be fabricated in their entirety of steel plate having a thickness equal to the sum of the pipe wall plus the required reinforcement.
3. Fittings shall be manufactured with crotch plate reinforcements as shown on the Drawings or as required by design procedures in AWWA Manual M11, whichever requirements are more stringent.

F. Closures and Correction Pieces. Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing indicated. The locations of correction pieces and closure assemblies shall be shown on the pipe layout drawings and shall be subject to the OWNER's review. Any change in location or number of said items shall be accepted by the OWNER. Closure pieces shall be welded inside and out at each joint.

2.03 DESIGN OF SPECIALS AND FITTINGS

A. General. The specials shall be of the diameter and wall thickness shown on the Drawings, or in accordance with these Contract Documents. Where not otherwise shown, reinforcement for fittings shall be designed by the pipe manufacturer in accordance with AWWA Manual M11. Shop welding shall conform to the applicable provisions of the ASME BPVC. Except as otherwise provided herein, specials shall be fabricated from materials in full conformance with the requirements of Section 15055 STEEL PIPE, (AWWA C200, MODIFIED), ANSI/AWWA C200, and the dimensions of ANSI/AWWA C208.

B. The minimum thickness of plate for pipe from which specials are to be fabricated shall be the thickness of adjacent mainline pipe, the thickness shown on the Drawings, or whichever is thicker.

C. Design Pressure. All fittings and specials shall be properly reinforced to withstand the internal working and transient pressure, both circumferential and longitudinal, and external loading conditions. Specials and fittings shall be equal to adjoining pipe in pressure and external loading design strength.

D. Bevels and Miters. Unless otherwise shown, the minimum radius of elbows shall be 2.5 times the pipe diameter and the maximum miter angle on each section of the elbow shall not exceed 11-1/4 degrees. Moderate deflections and long radius curves shall be designed using beveled joint rings. The maximum total allowable angle for beveled joints shall be 3 degrees per pipe joint. Miters shall be provided on the bell ends. Mitering of the spigot ends will not be permitted.

E. Deflection at Joints. Minor field adjustments can be made by pulling standard joints. The maximum allowable angle for pulled joints shall be as specified in15055, STEEL PIPE, (AWWA C200 MODIFIED) or the angle which results from a ¾-inch pull out from normal joint closure, whichever is less.

F. All horizontal deflections or fabricated angles shall fall on the horizontal alignment, as shown on the Drawings. All vertical deflections shall fall on the vertical alignment, and the pipe angle point locations shall match the locations shown on the Drawings.

G. Joints. All joints and related work for field assembly of the pipe and specials shall conform to Section15055, STEEL PIPE, (AWWA C200 MODIFIED). All shop joints shall be complete penetration butt-welds unless otherwise shown.

H. Steel Welding Fittings. Steel welding fittings for pipe spools and fittings 24 inches in diameter and smaller shall be in accordance with ANSI/ASME B16.9 conforming to ASTM A234. Taper pipe wall at welds at 4:1 for connection to pipe of different wall thicknesses. The CONTRACTOR shall be fully responsible for coordinating the difference in diameter convention between these specials and ANSI/AWWA C200/C208 pipe and fittings to provide complete piping systems as shown.

I. Ends for Mechanical Type Couplings. Except as otherwise shown, where mechanical-type couplings are shown, the ends of pipe shall be shoulder banded with Type C collared ends using double fillet welds. Where pipe 12-inches in diameter and smaller is furnished in standard schedule thicknesses and where the wall thickness equals or

exceeds the coupling manufacturer's minimum wall thickness, the pipe ends may be grooved.

J. Where welded test heads or bulkheads are used, extra length shall be provided to each opening of the special. After removal of each test head, the special shall be trimmed back to the design points with all finished plate edges ground smooth, straight, and prepared for the field joint.

PART 3 EXECUTION

3.01 GENERAL

A. Provide all specials, bolts, nuts, gaskets, jointing materials and all other appurtenances as indicated to provide a complete and workable installation. Where pipe support details are indicated, the supports shall conform thereto and shall be placed as indicated; provided that the support for all exposed piping shall be complete and adequate regardless of whether or not supporting devices are specifically indicated. Where indicated, welded joints shall be provided. Unless otherwise indicated, all specials shall be installed in full conformance with Section15055, STEEL PIPE, (AWWA C200 MODIFIED). At no additional cost to the OWNER, CONTRACTOR shall install temporary bulkheads as necessary to secure the pipe at night and when pipe laying operations are not being performed. Temporary bulkheads shall be waterproof.

B. Lining and Coating. Specials shall have the same lining and coating as the adjoining pipe. Specials shall be lined and coated using the same thickness, application and curing of lining indicated for straight pipe in accordance with the applicable AWWA or ASTM Standards, as modified in Section 15055 STEEL PIPE, (AWWA C200 MODIFIED), Section 09911 – POLYURETHANE COATING FOR STEEL PIPE, or by any other applicable sections in these Specifications with the following provisions.

1. Specials that cannot be lined centrifugally or with field lining equipment shall be lined by hand. In such case, the lining shall be reinforced with welded wire fabric positioned approximately in the center of the lining and in accordance with the requirements of ANSI/AWWA C205 for lining specials.

2. Specials that cannot be mechanically coated shall be coated by hand-application. Coating applied in this manner shall provide protection equal to that specified for the pipe. Fittings may be fabricated from pipe that has been mechanically lined or coated. Areas of coating that have been damaged by such fabrication shall be removed and reapplied by hand-applications.

3. Unless otherwise indicated, the exterior surfaces of pipe or fittings passing through a structure wall shall be tape or polyurethane coated from the center of the wall or wall flange to the end of the underground portion of pipe or fitting.

4. Pipe above ground or in structures shall be shop primed and field coated as specified in Section 09900, PAINTING AND COATINGS.

5. Portions of wall sleeves that penetrate into structures and will be embedded in concrete shall be shop-lined and coated in accordance with requirements for submerged conditions as specified in Section 09900, PAINTING AND COATINGS.

C. Handling and Storage. Specials handling and storage shall be as specified in Section15055, STEEL PIPE, (AWWA C200 MODIFIED).

D. Holiday Testing. Specials shall be tested for holidays as specified in Section15055, STEEL PIPE, (AWWA C200 MODIFIED) and Section 09911 POLYURETHANE COATING FOR STEEL PIPE.

E. Protection of Specials. At all times when the work of installing pipe is not in progress, the pipe shall be protected as specified in Section15055, STEEL PIPE, (AWWA C200 MODIFIED).

F. Pipe Cleanup. Maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until its acceptance by the OWNER as specified in Section 02571, STEEL PIPE, MORTAR-LINED (AWWA C200 MODIFIED).

G. Field Welding. Field welding shall conform to ANSI/AWS D1.1 and ANSI/AWWA C206.

H. Markings. Markings shall be as specified in Section15055, STEEL PIPE, (AWWA C200 MODIFIED).

I. Take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source. The CONTRACTOR shall assume full responsibility for any damage due to this cause, and shall at its own expense replace the pipe to its specified condition and grade if it is displaced due to floating. Maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until its acceptance by the OWNER.

3.02 INSTALLATION OF FABRICATED SPECIALS, AND CONCRETE-ENCASED PIPE WITHIN STRUCTURES

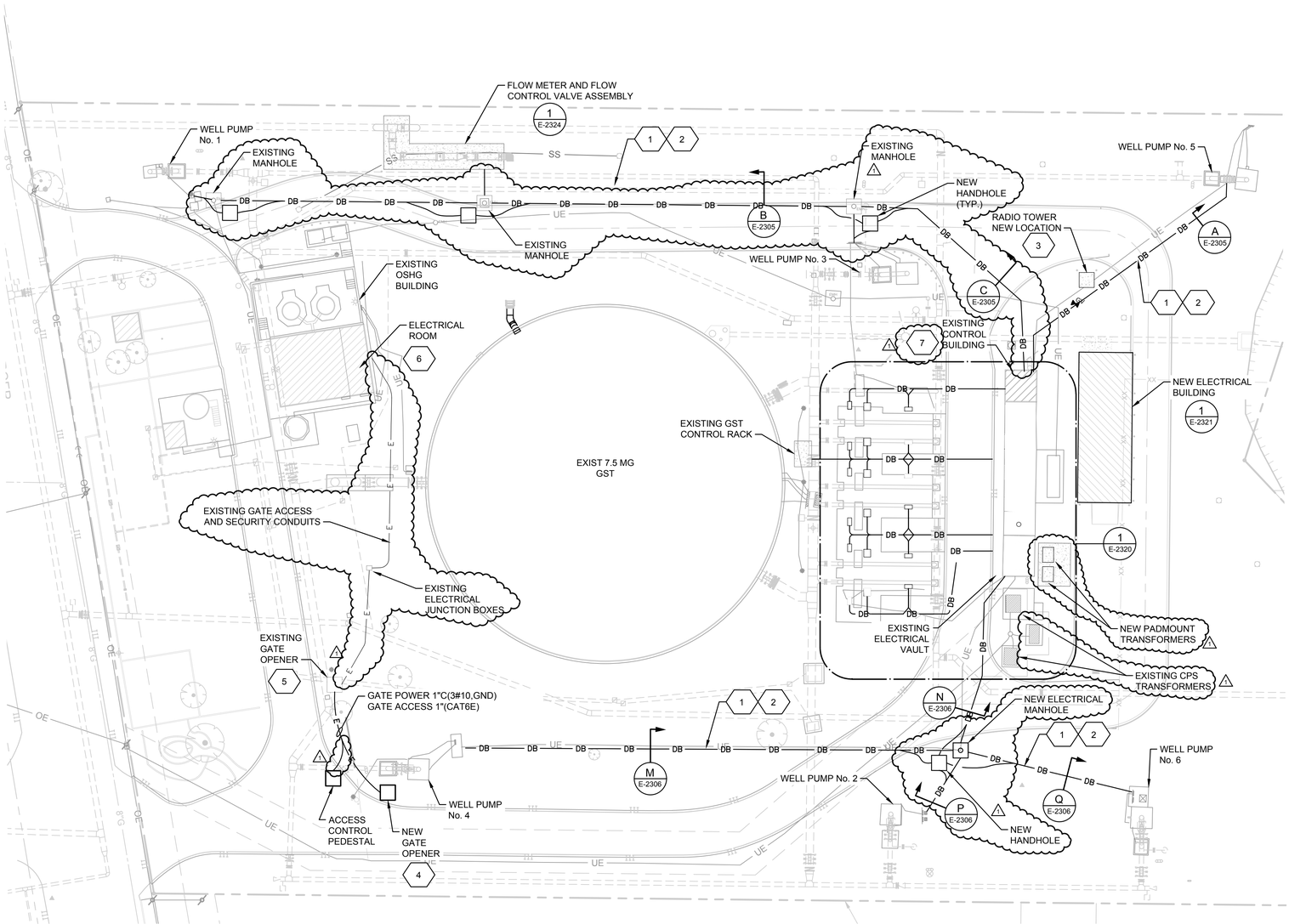
A. Trenches shall be kept dry in accordance with Section 02200, EARTHWORK when the pipe special is laid. The pipe and specials shall be laid to the line and grade indicated as specified in Section 15055 – STEEL PIPE, (AWWA C200 MODIFIED) and shall be closely jointed to form a smooth flow line. Immediately before placing each section of pipe in final position for jointing, the bedding shall be checked for firmness and uniformity of surface. Steel pipe encased in concrete within structures shall be hydrostatically tested in conformance with Section 15014, PRESSURE TESTING OF PIPING, prior to encasement.

B. The pipe shall be appropriately supported in the proper position prior to placing steel reinforcement or concrete.

C. Steel reinforcement shall be constructed around the pipe and supported in a manner that does not touch the pipe or provide any metallic contact with the pipe. Steel reinforcement shall conform to the requirements of Section 03200, CONCRETE.

D. Place concrete for encasement as shown on the Drawings. Construction joints shall be located in the encasement to limit the size of each placement in order to avoid cold joints and to prevent floatation of the pipeline.

END OF SECTION



1 SITE PLAN - 1
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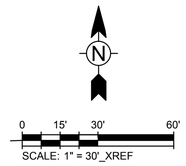

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXISTING UNDERGROUND DUCTBANKS AND UTILITIES.
2. NEW DUCTBANKS WITH 5KV CONDUCTORS SHALL BE INSTALLED WITH A MINIMUM SEPARATION OF 7.5" (EDGE OF CONCRETE TO EDGE OF CONCRETE).
3. REFER TO TOWER NOTES ON THIS SHEET.
4. CONTRACTOR SHALL INSTALL NEW GATE CONTROLLER AND ACCESSORIES. NEW CONTROLLER SHALL BE CONNECTED TO EXISTING GATE CONTROLLER.
5. CONTRACTOR SHALL VERIFY EXISTING CONDUIT AND WIRES FROM EXISTING GATE CONTROLLER NETWORK IN ELECTRICAL ROOM. CONTRACTOR SHALL INSTALL NEW POWER AND COMMUNICATIONS AS SHOWN.
6. CONTRACTOR SHALL CONNECT NEW GATE TO THE EXISTING ACCESS CONTROLLER. PROVIDE SERVICES AS REQUIRED TO HAVE GATE OPERATE TO MATCH EXISTING.
7. REFER TO SHEET I-2311 FOR SUPERVISORY CONTROL PANEL REPLACEMENT REQUIREMENTS. (1)

TOWER NOTES:

1. CONTRACTOR SHALL TEMPORARILY MOVE EXISTING ANTENNA (2 TOTAL) FROM EXISTING TOWER.
2. BROAD BAND ANTENNA SHALL BE MOUNTED TO GST HANDRAIL. THIS TEMPORARY ANTENNA SHALL BE OPERATIONAL PRIOR TO REMOVING EXISTING ANTENNA.
3. WELL PUMP FLOW METER WIRELESS NETWORK ANTENNA FOR FLOW METERS SHALL BE MOUNTED TO EXISTING CONTROL BUILDING. THIS TEMPORARY ANTENNA SHALL BE OPERATIONAL PRIOR TO REMOVING EXISTING ANTENNA.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING THE EXISTING PLC IN THE CONTROL BUILDING TO ACCEPT THE NEW FLOW METER WIRELESS NETWORK. CONTRACTOR SHALL SUBMIT PROPOSED PROGRAMMING LOGIC AND NETWORK CONFIGURATION TO OWNER AND ENGINEER PRIOR TO MODIFICATIONS.
5. EXISTING TOWER AND ATTACHED ENCLOSURES SHALL BE REMOVED FROM THE EXISTING FOUNDATION. CONTRACTOR SHALL DISASSEMBLE TOWER AND STORE FOR FUTURE INSTALLATION.
6. CONTRACTOR SHALL REMOVE EXISTING FOUNDATION GROUNDING RING AND CONDUITS FOR EXISTING TOWER. CONDUITS SHALL BE REMOVED BACK TO SOURCE IN CONTROL BUILDING. CONTRACTOR SHALL REPAIR EMPTY OPENINGS IN CONTROL BUILDING WALL.
7. AFTER FINAL GRADING IS COMPLETED FOR NEW ELECTRICAL BUILDING, PROVIDE NEW TOWER FOUNDATION AS SHOWN ON STRUCTURAL DRAWINGS.
8. THE EXISTING SHALL BE ASSEMBLED AND MOUNTED TO THE NEW FOUNDATION.
9. ANTENNA AND CABLES SHALL BE INSTALLED TO MATCH EXISTING CONFIGURATION.
10. NEW ANTENNAE SHALL BE OPERATIONAL PRIOR TO REMOVING TEMPORARY ANTENNAE.

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San Antonio, TX 78205
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BID SET

SAN ANTONIO WATER SYSTEM

MARK	DATE	DESCRIPTION	BY
1	08/22/18	PER ADDENDUM NO. 2	TG

SAN ANTONIO WATER SYSTEM
CENTRAL WATER INTEGRATION PIPELINE
MALTSBERGER PS IMPROVEMENTS

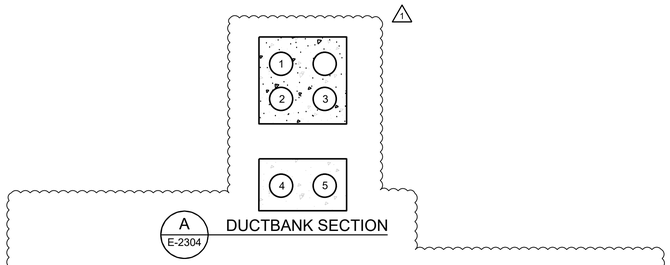
MALTSBERGER PS ELECTRICAL SITE PLAN - 1

STATE OF TEXAS
TIMOTHY D. GOBROGGE
128455
LICENSED
PROFESSIONAL ENGINEER
8/22/2018

PROJ:	200-09308-18001
DESN:	TDG
DRWN:	EDJ
CHKD:	-

E-2304

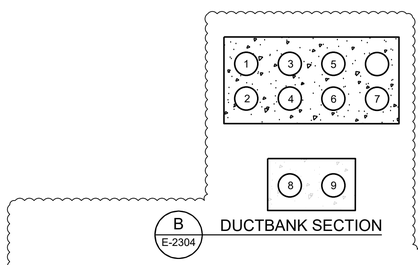
Bar measures 1 inch, otherwise drawing is not to scale



A E-2304 DUCTBANK SECTION

TABLE FOR SECTION A

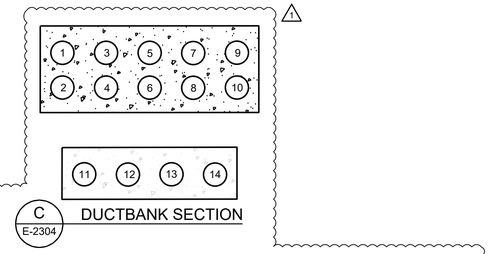
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SPARE	2"	WELL-5 CONTROL RACK TO VAULT
2	WT, BT	2"	WELL-5 CONTROL RACK TO VAULT
3	120 POWER	2"	WELL-5 DISCHARGE VALVE CONTROL RACK TO VAULT
4	SPARE	4"	WELL-5 MOTOR TERMINAL TO VAULT
5	WELL-MV	4"	WELL-5 MOTOR TERMINAL TO VAULT



B E-2304 DUCTBANK SECTION

TABLE FOR SECTION B

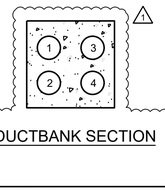
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SPARE	2"	WELL-1 CONTROL RACK TO VAULT
2	WT, BT	2"	WELL-1 CONTROL RACK TO VAULT
3	120 POWER	2"	WELL-1 DISCHARGE VALVE CONTROL RACK TO VAULT
4	FT, PT, FCV	2"	FCV ASSEMBLY TO VAULT
5	SPARE	2"	FCV ASSEMBLY TO VAULT
6	WELL-MV-MOV	2"	WELL-1 MOTOR TERMINAL TO VAULT
7	WELL-MV-PP-PWR	2"	WELL-3 MOTOR TERMINAL TO VAULT
8	WELL-MV	4"	WELL-3 MOTOR TERMINAL TO VAULT
9	SPARE	2"	WELL-3 MOTOR TERMINAL TO VAULT



C E-2304 DUCTBANK SECTION

TABLE FOR SECTION C

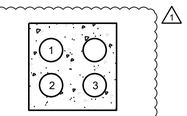
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SPARE	2"	WELL-1 CONTROL RACK TO VAULT
2	WT, BT	2"	WELL-1 CONTROL RACK TO VAULT
3	120 POWER	2"	WELL-1 DISCHARGE VALVE CONTROL RACK TO VAULT
4	SPARE	2"	WELL-3 CONTROL RACK TO VAULT
5	WT, BT	2"	WELL-3 CONTROL RACK TO VAULT
6	120 POWER	2"	WELL-3 DISCHARGE VALVE CONTROL RACK TO VAULT
7	FT, PT, FCV	2"	FCV ASSEMBLY TO VAULT
8	SPARE	2"	FCV ASSEMBLY TO VAULT
9	WELL-MV-MOV	2"	WELL-1 MOTOR TERMINAL TO VAULT
10	WELL-MV-PP-PWR	2"	WELL-3 MOTOR TERMINAL TO VAULT
11	WELL-MV	2"	WELL-1 MOTOR TERMINAL TO VAULT
12	SPARE	2"	WELL-1 MOTOR TERMINAL TO VAULT
13	WELL-MV	2"	WELL-3 MOTOR TERMINAL TO VAULT
14	SPARE	2"	WELL-3 MOTOR TERMINAL TO VAULT



D E-2320 DUCTBANK SECTION

TABLE FOR SECTION D

CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SC-MOV, MOV-C	2"	HSP-1 DISCHARGE VALVE CONTROL RACK TO VAULT
2	FT	2"	HSP-1 DISCHARGE VALVE CONTROL RACK TO VAULT
3	PNL-P	2"	HSP-1 DISCHARGE VALVE CONTROL RACK TO VAULT
4	SPARE	2"	HSP-1 DISCHARGE VALVE CONTROL RACK TO VAULT



E E-2320 DUCTBANK SECTION

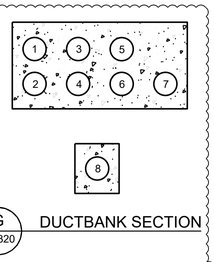
TABLE FOR SECTION E

CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	PB2, CSE, SH	2"	HSP-1 CONTROL RACK TO VAULT
2	WT, BT	2"	HSP-1 CONTROL RACK TO VAULT
3	SPARE	2"	HSP-1 CONTROL RACK TO VAULT

F E-2320 DUCTBANK SECTION

TABLE FOR SECTION F

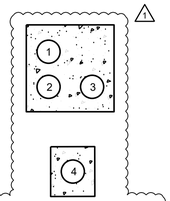
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	HSP MV	3"	HSP-1 MOTOR TERMINAL TO VAULT



G E-2320 DUCTBANK SECTION

TABLE FOR SECTION G

CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SC-MOV, MOV-C	2"	HSP-1 DISCHARGE VALVE TO VAULT
2	FT	2"	HSP-1 DISCHARGE VALVE TO VAULT
3	PB2, CS2, SH	2"	HSP-1 CONTROL RACK TO VAULT
4	SPARE	2"	HSP-1 DISCHARGE VALVE TO VAULT
5	PB2, CS2, SH	2"	HSP-1 DISCHARGE VALVE TO VAULT
6	WT, BT	2"	HSP-1 CONTROL RACK TO VAULT
7	SPARE	3"	HSP-1 CONTROL RACK TO VAULT
8	HSP-MV	3"	HSP-1 MOTOR TERMINAL TO VAULT



H E-2320 DUCTBANK SECTION

TABLE FOR SECTION H

CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	PB2, CS2, SH	2"	HSP-1 CONTROL RACK TO VAULT
2	SPARE	2"	HSP-1 CONTROL RACK TO VAULT
3	WT, BT	2"	HSP-1 CONTROL RACK TO VAULT
4	HSP MV	3"	HSP-1 MOTOR TERMINAL TO VAULT

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BID SET

SAN ANTONIO WATER SYSTEM

MARK	DATE	DESCRIPTION	BY
1	08/22/18	PER ADDENDUM NO. 2	TG

SAN ANTONIO WATER SYSTEM
CENTRAL WATER INTEGRATION PIPELINE
MALTSBERGER PS IMPROVEMENTS

MALTSBERGER PS ELECTRICAL DUCTBANK SECTION - I

STATE OF TEXAS
TIMOTHY D. GOBROGGE
128455
LICENSED
PROFESSIONAL ENGINEER
8/22/2018

PROJ:	200-09308-18001
DESN:	TDG
DRWN:	EDJ
CHKD:	-

E-2305

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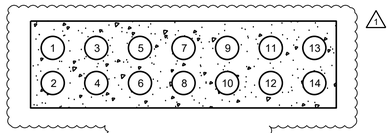
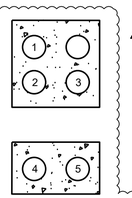


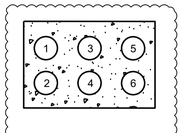
J E-2320 DUCTBANK SECTION

TABLE FOR SECTION J			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SC-MOV, MOV-C	2"	HSP-2 DISCHARGE CONTROL RACK TO VAULT
2	FT	2"	HSP-2 DISCHARGE CONTROL RACK TO VAULT
3	PB2, CS2, SH	2"	HSP-2 CONTROL RACK TO VAULT
4	PB2, CS2, SH	2"	HSP-3 CONTROL RACK TO VAULT
5	SPARE	2"	HSP-3 CONTROL RACK TO VAULT
6	SC-MOV, MOV-C	2"	HSP-3 DISCHARGE VALVE CONTROL RACK TO VAULT
7	FT	2"	HSP-3 DISCHARGE VALVE CONTROL RACK TO VAULT
8	PNL-P	2"	HSP-2 DISCHARGE VALVE CONTROL RACK TO VAULT
9	SPARE	2"	HSP-2 DISCHARGE VALVE CONTROL RACK TO VAULT
10	WT, BT	2"	HSP-2 CONTROL RACK TO VAULT
11	SPARE	2"	HSP-2 CONTROL RACK TO VAULT
12	WT, BT	2"	HSP-3 CONTROL RACK TO VAULT
13	PNL-P	2"	HSP-3 DISCHARGE VALVE CONTROL RACK TO VAULT
14	SPARE	2"	HSP-3 DISCHARGE VALVE CONTROL RACK TO VAULT
15	HSP-MV	3"	HSP-2 MOTOR TERMINAL TO VAULT
16	HSP-MV	3"	HSP-3 MOTOR TERMINAL TO VAULT



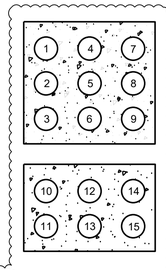
M E-2304 DUCTBANK SECTION

TABLE FOR SECTION M			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SPARE	2"	WELL-4 CONTROL RACK TO VAULT
2	WT, BT	2"	WELL-4 CONTROL RACK TO VAULT
3	120 POWER	2"	WELL-4 DISCHARGE VALVE CONTROL RACK TO VAULT
4	SPARE	4"	WELL-4 MOTOR TERMINAL TO VAULT
5	WELL-MV	4"	WELL-4 MOTOR TERMINAL TO VAULT



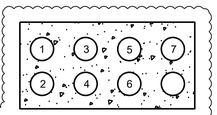
K E-2320 DUCTBANK SECTION

TABLE FOR SECTION K			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	PB2, CS2, SH	2"	HSP-2 CONTROL RACK TO VAULT
2	WT, BT	2"	HSP-2 CONTROL RACK TO VAULT
3	SPARE	2"	HSP-3 CONTROL RACK TO VAULT
4	SPARE	2"	HSP-2 CONTROL RACK TO VAULT
5	PB2, CS2, SH	2"	HSP-3 CONTROL RACK TO VAULT
6	WT, BT	2"	HSP-3 CONTROL RACK TO VAULT
7	HSP-MV	3"	HSP-2 MOTOR TERMINAL TO VAULT
8	HSP-MV	3"	HSP-3 MOTOR TERMINAL TO VAULT



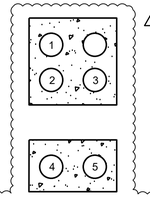
N E-2304 DUCTBANK SECTION

TABLE FOR SECTION N			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SPARE	2"	WELL-4 CONTROL RACK TO VAULT
2	WT, BT	2"	WELL-4 CONTROL RACK TO VAULT
3	120 POWER	2"	WELL-4 DISCHARGE VALVE CONTROL RACK TO VAULT
4	SPARE	2"	WELL-2 CONTROL RACK TO VAULT
5	WT, BT	2"	WELL-2 CONTROL RACK TO VAULT
6	120 POWER	2"	WELL-2 DISCHARGE VALVE CONTROL RACK TO VAULT
7	WT, BT	2"	WELL-6 CONTROL RACK TO VAULT
8	120 POWER	2"	WELL-6 CONTROL RACK TO VAULT
9	SPARE	2"	WELL-6 CONTROL RACK TO VAULT
10	SPARE	4"	WELL-4 MOTOR TERMINAL TO VAULT
11	WELL-MV	4"	WELL-4 MOTOR TERMINAL TO VAULT
12	WELL-MV	4"	WELL-2 MOTOR TERMINAL TO VAULT
13	SPARE	4"	WELL-2 MOTOR TERMINAL TO VAULT
14	WELL-MV	4"	WELL-6 MOTOR TERMINAL TO VAULT
15	SPARE	4"	WELL-6 MOTOR TERMINAL TO VAULT



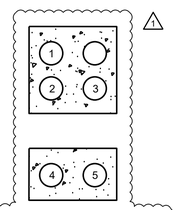
L E-2320 DUCTBANK SECTION

TABLE FOR SECTION L			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	L001	2"	HSP-1
2	L002	2"	HSP-1
3	L003	4"	HSP-1
4	L004	2"	HSP-1
5	L005	2"	HSP-1
6	L006	4"	SPARE
7	L007	2"	HSP-1



P E-2304 DUCTBANK SECTION

TABLE FOR SECTION P			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SPARE	2"	WELL-2 CONTROL RACK TO VAULT
2	WT, BT	2"	WELL-2 CONTROL RACK TO VAULT
3	120 POWER	2"	WELL-2 DISCHARGE VALVE CONTROL RACK TO VAULT
4	WELL-MV	4"	WELL-2 MOTOR TERMINAL TO VAULT
5	SPARE	4"	WELL-2 MOTOR TERMINAL TO VAULT



Q E-2304 DUCTBANK SECTION

TABLE FOR SECTION Q			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SPARE	2"	WELL-6 CONTROL RACK TO VAULT
2	WT, BT	2"	WELL-6 CONTROL RACK TO VAULT
3	120 POWER	2"	WELL-6 DISCHARGE VALVE CONTROL RACK TO VAULT
4	WELL-MV	4"	WELL-6 MOTOR TERMINAL TO VAULT
5	SPARE	4"	WELL-6 MOTOR TERMINAL TO VAULT

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BID SET

SAN ANTONIO WATER SYSTEM

MARK	DATE	DESCRIPTION	BY
1	08/22/18	PER ADDENDUM NO. 2	TG

SAN ANTONIO WATER SYSTEM
CENTRAL WATER INTEGRATION PIPELINE
MALTSBERGER PS IMPROVEMENTS

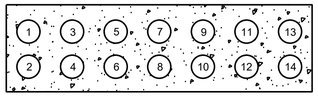
MALTSBERGER PS ELECTRICAL DUCTBANK SECTION - II

STATE OF TEXAS
TIMOTHY D. GOBROGGE
128455
LICENSED PROFESSIONAL ENGINEER
8/22/2018

PROJ: 200-09308-18001
DESN: TDG
DRWN: EDJ
CHKD: -

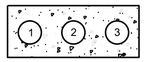
E-2306

Bar measures 1 inch, otherwise drawing is not to scale



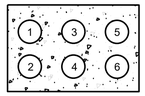
R E-2320 DUCTBANK SECTION

TABLE FOR SECTION R			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SC-MOV, MOV-C	2"	HSP-4 DISCHARGE CONTROL RACK TO VAULT
2	FT	2"	HSP-4 DISCHARGE CONTROL RACK TO VAULT
3	PB2, CS2, SH	2"	HSP-4 CONTROL RACK TO VAULT
4	PB2, CS2, SH	2"	HSP-5 CONTROL RACK TO VAULT
5	SPARE	2"	HSP-5 CONTROL RACK TO VAULT
6	SC-MOV, MOV-C	2"	HSP-5 DISCHARGE VALVE CONTROL RACK TO VAULT
7	FT	2"	HSP-5 DISCHARGE VALVE CONTROL RACK TO VAULT
8	PNL-P	2"	HSP-4 DISCHARGE VALVE CONTROL RACK TO VAULT
9	SPARE	2"	HSP-4 DISCHARGE VALVE CONTROL RACK TO VAULT
10	WT, BT	2"	HSP-4 CONTROL RACK TO VAULT
11	SPARE	2"	HSP-4 CONTROL RACK TO VAULT
12	WT, BT	2"	HSP-5 CONTROL RACK TO VAULT
13	PNL-P	2"	HSP-5 DISCHARGE VALVE CONTROL RACK TO VAULT
14	SPARE	2"	HSP-5 DISCHARGE VALVE CONTROL RACK TO VAULT
15	HSP-MV	3"	HSP-4 MOTOR TERMINAL TO VAULT
16	POWER PANEL	2"	CONTROL RACK TO VAULT
17	LEVEL RELAY CONTROLLER	2"	CONTROL RACK TO VAULT
18	LT, AIT	2"	CONTROL RACK TO VAULT
19	HSP-MV	3"	HSP-5 MOTOR TERMINAL TO VAULT



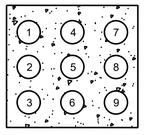
T E-2320 DUCTBANK SECTION

TABLE FOR SECTION T			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	POWER PANEL	2"	CONTROL RACK TO VAULT
2	LEVEL RELAY CONTROLLER	2"	CONTROL RACK TO VAULT
3	LT, AIT	2"	CONTROL RACK TO VAULT



U E-2320 DUCTBANK SECTION

TABLE FOR SECTION U			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	SC-MOV, MOV-C	2"	HSP-6 DISCHARGE VALVE TO VAULT
2	FT	2"	HSP-6 DISCHARGE VALVE TO VAULT
3	PB2, CS2, SH	2"	HSP-6 CONTROL RACK TO VAULT
4	SPARE	2"	HSP-6 DISCHARGE VALVE TO VAULT
5	PB2, CS2, SH	2"	HSP-7 DISCHARGE VALVE TO VAULT
6	WT, BT	2"	HSP-7 CONTROL RACK TO VAULT
7	HSP-MV	3"	HSP-6 MOTOR TERMINAL TO VAULT
8	HSP-MV	3"	HSP-7 MOTOR TERMINAL TO VAULT



S E-2320 DUCTBANK SECTION

TABLE FOR SECTION S			
CONDUIT NO.	CONDUIT TAG	CONDUIT SIZE	DESCRIPTION
1	PB2, CS2, SH	2"	HSP-4 CONTROL RACK TO VAULT
2	WT, BT	2"	HSP-4 CONTROL RACK TO VAULT
3	SPARE	2"	HSP-5 CONTROL RACK TO VAULT
4	SPARE	2"	HSP-4 CONTROL RACK TO VAULT
5	PB2, CS2, SH	2"	HSP-5 CONTROL RACK TO VAULT
6	WT, BT	2"	HSP-5 CONTROL RACK TO VAULT
7	POWER PANEL	2"	CONTROL RACK TO VAULT
8	LEVEL RELAY CONTROLLER	2"	CONTROL RACK TO VAULT
9	LT, AIT	2"	CONTROL RACK TO VAULT
10	HSP-MV	3"	HSP-4 MOTOR TERMINAL TO VAULT
11	HSP-MV	3"	HSP-5 MOTOR TERMINAL TO VAULT

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BID SET

SAN ANTONIO WATER SYSTEM

MARK	DATE	DESCRIPTION	BY
1	08/22/18	PER ADDENDUM NO. 2	TG

SAN ANTONIO WATER SYSTEM
CENTRAL WATER INTEGRATION PIPELINE
MALTSBERGER PS IMPROVEMENTS

MALTSBERGER PS ELECTRICAL DUCTBANK SECTION - III

STATE OF TEXAS
TIMOTHY D. GOBROGGE
128455
LICENSED PROFESSIONAL ENGINEER
8/22/2018

PROJ:	200-09308-18001
DESN:	TDG
DRWN:	EDJ
CHKD:	-

E-2307

Bar measures 1 inch, otherwise drawing is not to scale

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